

ENDANGERED SPECIES

Technical Bulletin

Department of Interior, U.S. Fish and Wildlife Service
Endangered Species Program, Washington, D.C. 20240

Listings Proposed for a Bird and Three Plants

During December 1985, the Fish and Wildlife Service (FWS) proposed adding a bird and three plants to the Federal List of Endangered and Threatened Wildlife and Plants. If the proposals become final rules, Endangered Species Act protection will be extended to the following taxa:

Florida Grasshopper Sparrow (*Ammodramus* *savannarum* *floridanus*)

Grasshopper sparrows (*Ammodramus* *savannarum*) are found throughout much of temperate North America. The Florida subspecies (*A. s. floridanus*), however, is restricted in range and is geographically isolated from others of the species by at least 310 miles (500 kilometers). It occurs only in parts of Florida's south-central prairie region that retain the specific habitat characteristics required by this subspecies.

Unlike the other two *A. savannarum* subspecies found east of the Rocky Mountains, the Florida grasshopper sparrow does not migrate. It also needs

a different kind of habitat; while most grasshopper sparrows seem to prefer open, grassy areas, the Florida subspecies inhabits the stunted growth of saw palmetto, dwarf oaks, bluestems, and wiregrass. A low, sparse growth of these plants, rather than sod-forming grasses, apparently is needed by this ground-nesting bird.

In the early 1900's, populations of Florida grasshopper sparrows reportedly were large and widespread; however, surveys conducted between 1980 and 1984 indicate that the bird has declined in numbers and range. The total population of this subspecies may consist of fewer than 250 adults at 9 scattered sites. Accordingly, the FWS has proposed to list the Florida grasshopper sparrow as Endangered (F.R. 12/18/85).

Conversion of native grasslands to improved pastures is the greatest threat to its survival. Apparently the sparrows can tolerate some alteration in vegetation composition and structure, but they cannot adopt to the conditions that result from intensive pasture management. Grasshopper sparrows have been found *only* in areas that retain at least some of the plants mentioned above.

Areas managed for grazing by mechanical clearing or by prescribed burns during winter (at intervals of 2 to 3 years) provide suitable habitat because native prairie grasslands are maintained at an early successional stage. Dense vegetation and accumulated litter probably preclude effective foraging by the Florida grasshopper sparrow.

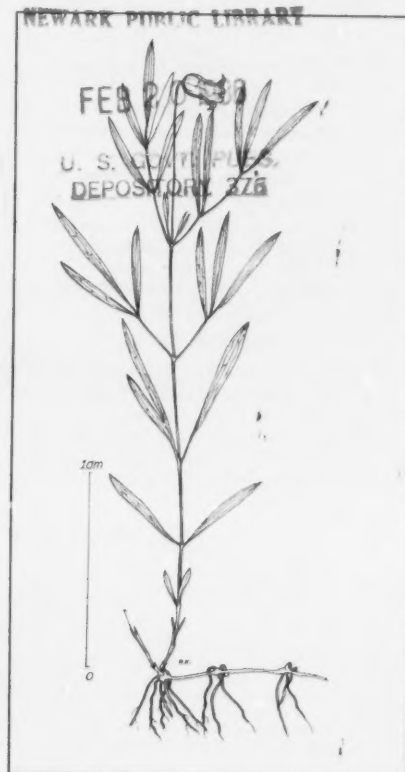
The Florida grasshopper sparrow occurs on private land, two State wildlife management areas (Three Lakes WMA in Osceola County and Fisheating Creek in Glades County), and the U.S. Air Force's Avon Park Bombing Range (of which inactive sections are leased for cattle grazing). It is not known if grasshopper sparrows live directly within the bombing range target areas, but the Air Force is aware of their possible presence and already considers their needs when making habitat decisions on the range. If the Florida grasshopper sparrow is listed, the Air Force will be required to consult with the FWS on any of its activities that may affect the bird.

Comments on the proposal to list the Florida grasshopper sparrow as Endangered are welcome, and should be sent to the Field Supervisor, Endangered Species Field Station, U.S. Fish and Wildlife Service, 2747 Art Museum Drive, Jacksonville, Florida 32207 by February 18, 1986.

Alabama Leather Flower (*Clematis* *socialis*)

One of Alabama's rarest plants, *C. socialis* is known to occur at only two small sites on and adjacent to highway rights-of-way. Certain roadside maintenance practices and potential land use changes threaten the species' survival,

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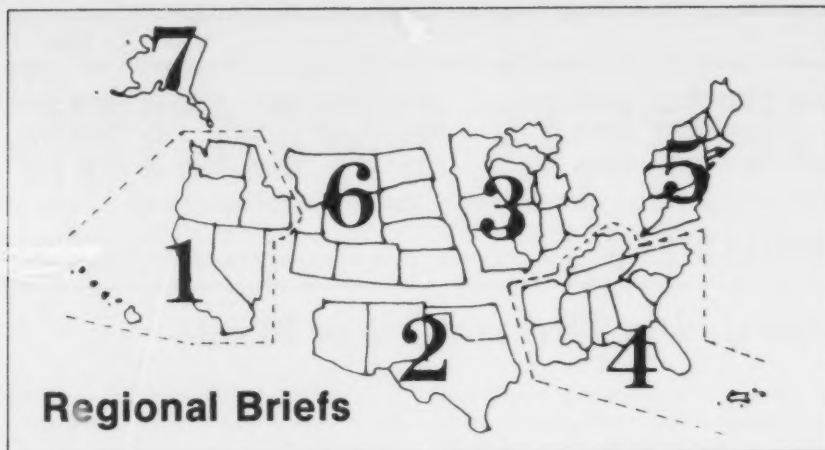


Alabama leather flower (*Clematis* *socialis*)



photo by Michael F. Delaney

The Florida grasshopper sparrow gets its common name from its song, which resembles the sound made by grasshoppers.



Endangered Species Program regional staffers have reported the following activities for the month of December:

Region 1—The fall 1985 (Oct. 28 - Nov. 2) southern sea otter (*Enhydra lutris nereis*) count has been reviewed and summarized. The total is the lowest

recorded to date since the current survey methods were employed in spring 1982; however, it does not vary significantly from the mean of the first six surveys. The total count for fall 1985 was 1,221 otters—1,066 independent animals and 155 pups.

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U.S. Fish and Wildlife Service Regions

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Information on the life history, habitat requirements, and status of the cui-ui (*Chasmistes cujus*) was provided to the Pyramid Lake Paiute Tribe during two recent meetings. The meetings were open forums for tribal members, along with their attorney, to debate the merits of the proposed Truckee River Settlement Bill of 1985, which was proposed to end 70 years of water use conflicts in the Truckee/Carson River systems. Although the Tribe voted one week later to oppose the bill, they also voted to continue negotiations. Results of these negotiations could significantly influence the restoration and possible recovery of the Endangered cui-ui.

Region 2—On December 18-19, an ABC-TV film crew visited Aransas National Wildlife Refuge (NWR) in Texas and filmed footage for a 5-minute special program segment on the Endangered whooping crane (*Grus americana*). The segment aired at the close of the evening national news broadcast on December 26. It was part of a 5-part series focusing primarily on Endangered species; other featured species included the California condor (*Gymnogyps californianus*), bald eagle (*Haliaeetus leucocephalus*), and Florida panther (*Felis concolor coryi*).

As of January 6, 1986, the number of whooping cranes wintering at Aransas NWR remained at 94.

Dr. Rod Drewien, a University of Idaho researcher working under contract with the FWS, located 30 whooping cranes wintering in New Mexico in December, and he believes the Rocky Mountain population now includes up to 35 individuals.

The Region 2 Endangered Species Office recently received authorization from the Mexican government to import up to 50 wild masked bobwhite (*Colinus virginianus ridgwayi*). These birds will be used to supplement the captive population of bobwhites currently held for propagation at the Patuxent Wildlife Research Center in Maryland. The offspring of these newly captured bobwhites will be reintroduced at the Buenos Aires NWR in southern Arizona over the next 2 years. Some of these offspring will also be sent to Mexico for display in that country's zoological facilities. The newly captured bobwhites will greatly improve the genetic diversity of the bobwhite population in the United States, thus helping to prevent inbreeding.

Dexter National Fish Hatchery in New Mexico had an excellent year for producing, stocking, and holding Threat-

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Three Animals Added to List of Endangered and Threatened Wildlife

During the month of December, Endangered Species Act protection was given to the following three species:

Piping Plover

The piping plover (*Charadrius melodus*) is a small, stocky shorebird that weighs from 1.5 to 2 ounces (42 to 64 grams), reaches about 7 inches (17 centimeters) long, and has a wingspread of approximately 15 inches (35 cm). Both male and female birds are similar in size, and both are colored pale brown on their upper parts and white on their underparts. A dark band encircling its body below the collar and a dark stripe across the forehead are distinguishing marks on adults in summer, but obscure in winter.

Piping plovers breed on the northern Great Plains, around the Great Lakes, and along the Atlantic coast. They occupy their breeding grounds from late March to August, nesting on sandy beaches along the ocean and inland lakes; on dredge and alluvial islands in rivers; and on salt-encrusted bare areas of sand, gravel, or pebbly mud on interior lakes and ponds. The nests themselves are shallow, scraped depressions that are sometimes lined with pebbles, shells, or other debris, and usually contain four eggs. When the breeding season ends, the shorebird winters along the Atlantic and Gulf of Mexico coasts from North Carolina to Florida, and in the Bahamas and West Indies.

By 1900, the piping plover, which was once described as a common resident on the beaches of the Atlantic coast, had been greatly reduced by year-round shooting. In some areas on the coast, the plover was close to extirpation. With the protection of the Migratory Bird Treaty Act, however, the species had recovered by the 1920's and was once again considered common. Since that time, the piping plover population again has decreased throughout most of its range, and it has vanished as a nesting species from many areas, most dramatically in the Great Lakes region. Where breeding does occur, it is curtailed primarily because of foot and vehicular traffic on the coastal beaches, which destroys nests and young.

Much of this bird's historical riverine habitat has been destroyed or modified by water development projects. Damming and channelization of rivers have reduced nesting habitat by eliminating sandbars along hundreds of miles of rivers in the Dakotas, Iowa, and Nebraska. Untimely water releases from dams subject remaining sandbar habitat to altera-

tion and flooding during the breeding season. The damming and withdrawal of water for irrigation and other agricultural purposes have reduced water flows in rivers such as the Platte River which has, in turn, led to dense vegetation growth that is less suitable for nesting plovers. In addition to extensive breeding area problems, the continual loss and modification of wintering habitat is also a significant threat to *C. melodus*.

On November 8, 1984, the Fish and Wildlife Service (FWS) published a proposed rule in the *Federal Register* to add the piping plover to the List of Endangered and Threatened Wildlife. (See story in BULLETIN Vol. IX No. 12.) Since the overall range of the piping plover has decreased considerably, and modification and destruction of its habitat continues, the FWS made a final determination on December 11, 1985, to list the species throughout its range. In the Great Lakes region, the bird is now listed as Endangered and in the remainder of its range (northern Great Plains, Atlantic coast, Gulf coast, Bahamas, and West Indies) as Threatened. Endangered status seems appropriate for piping plovers in the Great Lakes region because the species is near extirpation there; Threatened status is warranted for those in the remainder of its range due to the species' low numbers and the continual threats to its survival.

Critical Habitat for the piping plover was indeterminable at the time of the final rulemaking, mostly because of the often ephemeral nature of the species' nesting habitat. For example, beaches and interior wetlands may not be used by plovers each year because of varying water levels or natural changes in beach

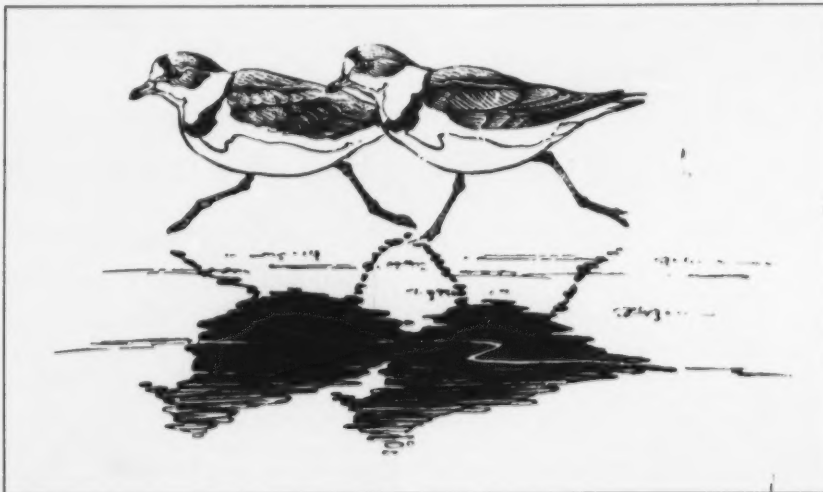
characteristics, and nesting sandbars may disappear.

Desert Dace

The desert dace (*Eremichthys acros*) is a fish endemic to a series of thermal spring habitats in the Soldier Meadows area of Humboldt County, Nevada, where it was discovered in 1939 and has apparently survived for at least tens of thousands of years. The desert dace is the only member of its genus and is characterized by the presence of prominent horny sheaths on its jaws which help the fish to scrape algae and other aquatic organisms from rock substrate. No other cyprinid possesses such a remarkable feeding adaptation. Noted for its high temperature tolerance, these fish typically occur in water ranging from 67° to 97° F, but have been observed in water as hot as 100.4° F. Water temperature appears to be a major factor controlling the distribution of desert dace within a spring system; when temperatures at a springhead exceed 100° F, desert dace are restricted to the somewhat cooler outflow downstream from the springs.

Most of the thermal springs and outflow creeks inhabited by *E. acros* occur on private lands where the landowner has modified much of the species' habitat by diverting outflow water away from the natural channels into manmade ditches. These diversions, made for agricultural purposes, are especially detrimental in spring systems where the head pool temperature far exceeds 100° F and cannot be tolerated by the dace. The species can then only occupy the out-

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Disturbance and habitat loss have reduced the piping plover to approximately 2,200 breeding pairs in the U.S. and Canada.

Three Animals

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flow creeks; the manmade ditches do not provide suitable habitat. Exotic fish that have been introduced into an area close to springs and outflows inhabited by desert dace may pose further threats to the species through competition and predation on the dace, and through the introduction of diseases and parasites.

The Soldier Meadows is designated as a Known Geothermal Resource Area, and geothermal exploration occurred there several years ago. If exploration and development are resumed, these activities could impact the desert dace by interfering with the aquifers that supply water to thermal springs in the area.

The FWS proposed to list the desert dace as Threatened on May 29, 1984. (See BULLETIN Vol. IX No. 6.) After a thorough review of all available information, *E. acros* was listed in a final rule published in the December 10, 1985, *Federal Register*. A designation of Critical Habitat was included as part of the final rule for all thermal springs and their outflows located within an area approximately 4 miles long and 1.0-2.7 miles wide in the Soldier Meadows region of Humboldt County, Nevada. (See final rule for a more complete description.) The quality and quantity of water in the pools and outflow streams designated as Critical Habitat for the desert dace are the most important factors in its conservation. Aquatic habitat modification, grazing and leasing of lands for geothermal exploration and/or development could result in adverse modification of desert dace habitat.

Guadalupe Fur Seal

The primary responsibility for the Guadalupe fur seal (*Arctocephalus townsendii*), as well as most other marine mammals, lies with the National Marine Fisheries Service (NMFS), Department of Commerce. On January

3, 1985, NMFS proposed to list the Guadalupe fur seal under the Endangered Species Act as a Threatened species. (See BULLETIN Vol. X No. 2.) Population numbers of this small to medium-sized seal once were estimated to be at least 30,000, but by the mid-19th century, commercial exploitation reduced the seal population to extremely low numbers. Recent surveys indicate that the total breeding population consists of approximately 1,600 animals and is likely restricted to the eastern shore of Guadalupe Island, Mexico. A few non-breeding individuals have been sporadically sighted in southern California waters near the Channel Islands.

Although the breeding population of *A. townsendii* is slowly growing, several actions have been proposed within the species' range that have the potential to modify or degrade portions of its habitat. Offshore oil and gas development activities are intensifying in central and southern California waters, and large amounts of spilled oil could affect individual fur seals. They rely on their thick pelage for insulation from the cold marine environment, and contact with oil can damage the fur's insulating qualities. Another potential impact could result from the U.S. Air Force's Space Shuttle Program. Launches over California are predicted to cause high intensity sonic booms that could cause short-term disturbance to seals. In addition, disturbance to seals breeding and resting on Guadalupe or San Miguel Island by tourists and fishing vessels may also potentially threaten *A. townsendii*.

The Guadalupe fur seal has been protected in the United States under the provisions of the Marine Mammal Protection Act since December 21, 1972. With the final listing rule (F.R. 12/16/85), the Endangered Species Act of 1973 will provide the species with additional protection. Critical Habitat was not designated as part of the final rule because the only areas that meet the requirements for such a designation are outside of U.S. jurisdiction.

Available Conservation Measures

As Endangered and Threatened species, the piping plover, desert dace, and Guadalupe fur seal now receive the protection authorized by the Endangered Species Act. Among the conservation measures provided to listed species are recognition of their precarious status, possible Federal funding for State conservation programs, recovery actions, and prohibitions against certain practices.

The prohibitions, in part, make it illegal to engage in interstate or international trafficking in listed species without a permit. For the fur seal and for the plover population listed as Endangered, standard prohibitions against take are now in effect. For the desert dace and the remaining populations of the piping plover, which are listed as Threatened, the protection measures are effectively the same, except that a broader category of permits is available. However, the Threatened listing of the desert dace includes a special rule that allows for take of the species as necessary and advisable for its conservation. Such taking is allowed without a Federal permit only if a State collection permit is obtained and all State wildlife regulations are satisfied. Taking under this special rule is allowed only for scientific, propagation, educational, or other purposes consistent with the Endangered Species Act.

Under Section 7 of the Act, Federal agencies are required to consult with the FWS to ensure that any actions they authorize, fund, or carry out will not jeopardize the survival of any listed species or adversely modify their Critical Habitat. These Section 7 regulations apply even when Critical Habitat has not been designated. Federal agencies that may be affected by the listing of the piping plover are the U.S. Army Corps of Engineers and the Bureau of Reclamation. With respect to the desert dace, Section 7 provisions may affect the Bureau of Land Management in the administration of its portion of the Critical Habitat area.

Effort to Capture Wild Condors is Suspended

A recent effort by the Fish and Wildlife Service to take all of the remaining wild California condors (*Gymnogyps californianus*) into captivity was halted January 9 for 20 days under a temporary restraining order won in Federal court by the National Audubon Society. If the capture effort is later reinstituted and completed, all 26 currently surviving condors will be located in captive breeding programs in Los Angeles and San Diego zoos, where biologists are attempting to promote condor reproduction without the risk of further deaths

in the wild. Six condors apparently died in the wild last winter.

Capture of the condors is considered a temporary measure by the FWS, which remains committed to the goal of establishing a secure, self-sustaining population of California condors in the wild.

Until recently, there were six wild condors remaining, two of them females. On January 3, 1986, the female member of the last wild pair was captured. It was found to be suffering from severe lead poisoning, probably the result of lead fragments the bird had ingested. An

examination at the San Diego Zoo revealed eight shotgun pellets embedded in one of its wings. Although these pellets did not cause the lead poisoning, they illustrate the obvious threat of wild condors being shot.

As the BULLETIN was going to press, it was learned that the recently captured female condor died on January 18, apparently from complications of lead poisoning. The February BULLETIN will provide further information.

Refuge Established for Endangered Hawaiian Forest Birds

by Peter A. Stine
Honolulu, Hawaii, Field Office —
Environmental Services

The Fish and Wildlife Service (FWS), in cooperation with The Nature Conservancy of Hawaii and the Hawaii Department of Land and Natural Resources has completed the purchase of 8,300 acres of native forest land on the island of Hawai'i. This is the first phase of the effort to establish a 33,500-acre Hakalau Forest National Wildlife Refuge for the long-term conservation of Endangered Hawaiian forest birds. Establishment of this refuge has been a high priority for endangered species conservation nationwide. The refuge area is located on the northwestern slope of Mauna Kea and is primarily rain forest, with some of the finest koa (*Acacia koa*)-'ohi'a (*Metrosideros collina*) and 'ohi'a forests remaining in the Hawaiian Islands.

ka'i. The Hakalau area was found to support some of the largest and most significant remaining populations of both Endangered and more common native forest birds in the State. The bird species include the Endangered 'akiapola'au (*Hemignathus munroi*), Hawai'i 'akepa (*Loxops coccineus coccineus*), Hawai'i creeper (*Oreomystis mana*), Hawaiian hawk or 'io (*Buteo solitarius*), and 'o'u (*Psittirostra psittacea*), and large populations of other native forest bird species still present on the island of Hawai'i.

Although the primary purpose of this refuge is for conservation of Endangered Hawaiian forest birds, it will also maintain habitat for many other unique Hawaiian plants and animals, as well as protect a vital watershed. The Endangered Hawaiian hoary bat (*Lasiurus cinereus semotus*), the State's only native terrestrial mammal, also occurs on the Hakalau area. Among the rare plants known from the refuge area are the following Category 1 candidates for listing as Threatened or Endangered: *Clermontia lindseyana*, *Clermontia pyralaria*, *Cyanea fernaldii*, *Cyanea shipmanii*, *Gouldia terminalis* var. *quadrangularis*, and *Platydesma remyi*.

The FWS soon will begin development of a comprehensive management plan to deal with the most significant and immediate threats to the maintenance of this native forest ecosystem. Management and research actions will emphasize maintaining and, where necessary, restoring the native koa-'ohi'a forest. The FWS will work closely with the State and county to ensure that the final plan addresses mutual land use and conser-



from a lithograph by F.W. Frohawk

'akiapola'au (*Hemignathus munroi*)

vation objectives. Accommodation of compatible uses of the area, such as various public uses, will also be considered.

The FWS and The Nature Conservancy of Hawaii plan to continue their efforts to complete the entire Hakalau Forest National Wildlife Refuge. In addition to the Hakalau Forest Refuge proper, discussions are in progress on a proposal to manage this area and the adjoining State-owned Conservation District and Natural Area Reserve lands as one contiguous koa-'ohi'a/'ohi'a rain forest ecosystem.

Realization of these goals will result in a major step toward recovery for a number of Endangered species in Hawaii.



Hawai'i 'akepa (*Loxops coccineus coccineus*)

Identification of the Hakalau area for refuge acquisition followed 7 years of research to assess the status and distribution of native Hawaiian forest birds. The FWS, with the assistance of the Hawaii Division of Forestry and Wildlife, conducted extensive surveys throughout forested lands on the islands of Hawai'i, Maui, Kaua'i, Lana'i and Molo-



from a lithograph by F.W. Frohawk

'o'u (*Psittirostra psittacea*)

Proposed Listings

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prompting the FWS to propose listing it as Endangered (12/6/85).

The Alabama leather flower is a perennial herb that forms dense clumps of clonal stems from rhizomes. It reaches 7 to 12 inches (18 to 30 centimeters) in height. During April to May, the plant bears solitary, blue-violet flowers shaped like urns or bells. *C. socialis* is thought to have excellent horticultural potential.

One population occurs on a roadside right-of-way and an adjacent privately owned woodland in St. Clair County. It consists of fewer than 50 clones and is restricted to less than one acre (0.4 hectare). The second population, found in Cherokee County, contains only a few clones and it also grows on a roadside right-of-way. Due to its proximity to highways, *C. socialis* has suffered repeated disturbances from such roadside maintenance techniques as herbicide application, mowing, and scraping. The St. Clair County population recently lost some leather flowers from mechanical disturbances when diseased pines were removed from the site. Encroaching residential development also threatens the habitat of this population.

There are no known Federal activities that would jeopardize the survival of *C. socialis*. Since being informed about the presence of this rare plant, both the Alabama Highway Department and the private landowner have expressed an interest in cooperating with the FWS on conservation of the species. A Federal listing of the Alabama leather flower would enhance and reinforce any protective measures taken.

Comments on the proposal to list *C. socialis* as Endangered are welcome, and should be sent to the Endangered Species Field Station, U.S. Fish and Wildlife Service, Jackson Mall Office Center, Suite 316, 300 Woodrow Wilson Avenue, Jackson, Mississippi 39213 by February 18, 1986.

Prairie Bush-clover (*Lespedeza leptostachya*)

A native of the midwestern United States, the prairie bush-clover has always been rare and localized in distribution. Currently, it is known to exist at about 24 sites scattered throughout southern Minnesota, western Wisconsin, northern Illinois, and northern and south-central Iowa. Certain agricultural practices and unfavorable vegetational changes are destroying its native prairie habitat. In an effort to prevent its extinction, the FWS has proposed to list the prairie bush-clover as a Threatened species (F.R. (12/6/85).



The prairie bush-clover (*Lespedeza leptostachya*) grows up to 40 inches (one meter) high, has narrow compound leaves, and produces spikes of 15 to 30 white to light purple flowers.

L. leptostachya inhabits dry to mesic native prairies that are well-drained, often gravelly, and located on kames or eskers (hills of glacially deposited material) and river terraces. A colonizer of open habitats, the species is adapted to the frequent occurrence of fire. Although it has always had a limited distribution, the prairie bush-clover survives in only a fraction of its historical range. Most of its habitat has been eliminated by agricultural activity, but other threats include quarrying, highway widening, and residential development.

The four States in which the prairie bush-clover is found officially list it as threatened or endangered under their own conservation programs, and give it varying forms of protection against taking and trade. Some of the habitat is protected as well. The largest *L. leptostachya* population, consisting of about 2,000 plants, is located within Minnesota's Kilen Woods State Park. Two other prairie bush-clover sites in Minnesota are owned by the Minnesota Historical Society and a private college. In Wisconsin, two sites are on land owned

either by The Nature Conservancy (TNC) or the Wisconsin Department of Natural Resources. Most of the Iowa populations are contained within State preserves, and one Illinois site is owned by the Illinois Department of Transportation. The Federal Endangered Species Act will supplement this existing habitat protection if the proposed listing is made final.

Comments on the proposal to list the prairie bush-clover as Threatened are welcome, and should be sent to the Endangered Species Coordinator, U.S. Fish and Wildlife Service, Federal Building, Fort Snelling, Twin Cities, Minnesota 55111 by February 4, 1986.

Jesup's Milk-vetch (*Astragalus robbinsii* var. *jesupii*)

The most vulnerable of two remaining *Astragalus robbinsii* varieties in New England, the Jesup's milk-vetch is known from only three sites along the Connecticut River in New Hampshire

and Vermont. A potential hydroelectric project and increased recreational activity could jeopardize its survival, and the FWS has recommended listing *A. r. var. jesupi* as Threatened (F.R. 12/19/85).

This perennial herb, a member of the pea family (Fabaceae), grows from rhizomes in the silt-filled crevices of calcareous schist outcrops found along the river. The riverbank ecosystem provides conditions essential to Jesup's milk-vetch growth and reproduction. High spring flows annually scour the rock outcrops and deposit nutrient-rich sediments. Shade provided by the mature hardwood trees growing at the tops of the riverbanks is another important factor in the plant's survival.

The Jesup's milk-vetch was first discovered along the Connecticut River near Hartland, Vermont, in 1881. Many early collections were taken at this site, and the population now consists of fewer than 75 plants. A population at Sumner's Falls near Plainfield, New Hampshire, numbers only six plants, and the most vigorous colony, of several hundred plants, occurs downstream of Claremont, New Hampshire. This unique corridor along the Connecticut River provides habitat for not only the Jesup's milk-vetch, but for two other candidates for Federal listing, the dwarf wedge mussel (*Alasmidonta heterodon*) and the cobblestone tiger beetle (*Cicindela marginipennis*). Fifteen plant species considered by the New Hampshire Natural Heritage Program as being rare, threatened, or endangered also occur along this stretch of river, which the Program identifies as "the most significant natural area in the State of New Hampshire in need of conservation."

Available Conservation Measures

If the proposals to list the above bird and plants are made final, these species will receive all the protection authorized under the Endangered Species Act. Among the benefits would be the require-

ment for the FWS to develop and implement recovery plans, the possibility of Federal aid to States with approved Endangered Species Cooperative Agreements, protection from jeopardy resulting from actions involving the Federal Government, and prohibitions against certain activities.

The Act prohibits the take, possession, or transport of listed animals. For listed plants, the rules are different; the ban on removing Endangered or Threatened plants applies only to those found on lands under Federal jurisdiction. None of the plants proposed for listing during December 1985 are known to occur on Federal lands.

Protection from harmful trade, however, applies for listed animals and plants. The Act prohibits interstate or international trafficking in listed species, except under Federal permit. Seeds from cultivated specimens of Threatened plants are exempt from trade prohibitions if containers display a statement of "cultivated origin."

Critical Habitat designations were not proposed for any of the above species. The Florida grasshopper sparrow is an animal that moves around frequently in order to take advantage of the changing mosaic of suitable habitat; therefore, Critical Habitat for this bird is not determinable. With regard to the plants, pinpointing their locations with a Critical Habitat designation could make them more vulnerable to vandalism or collecting. Nevertheless, if these species are listed, they will receive protection under Section 7 of the Endangered Species Act. Federal agencies will be required to ensure that any actions they fund, authorize, or carry out are not likely to jeopardize the survival of listed species. If an agency finds that one of its actions may affect such a species, it must consult with the FWS on ways to avoid jeopardy.

Two of the remaining Jesup's milk-vetch populations are small, easily accessible, and occur in areas where there is heavy recreational use. Sumner's

Falls, in particular, is a scenic area heavily used for canoeing, fishing, picnicking, sightseeing, and other activities. With the increasing demand for recreational opportunities, inadvertent trampling of the few remaining plants is a major concern.

The most significant threat to the plant, however, is direct inundation or alteration of its habitat by future hydro-power projects. The Federal Energy Regulatory Commission (FERC) issued a preliminary permit to a private developer for a 20 megawatt dam that would have destroyed two of the three populations and possibly harmed the third. Preliminary permits do not authorize the construction of a project, but grant the permittee exclusive rights to conduct studies on the feasibility of the project at the specified site.

The FWS notified FERC in November 1984 that the proposed project would have "substantial environmental impacts that will be difficult or impossible to mitigate..." and that it would "oppose issuance of a license..." These comments were based primarily on concerns about impacts on the Connecticut River Salmon Restoration Program, the loss of important fish and wildlife habitats, and the effects on rare, threatened, and endangered species. Although the developer recently decided not to proceed with the project, other private developers are free to explore the possibility of a project at the site.

If *A. r. var. jesupi* is listed federally as Threatened, FERC will be required to consult with the FWS under Section 7 of the Endangered Species Act on any proposed issuance of a permit for project construction. Section 7 requires Federal agencies to ensure that their actions are not likely to jeopardize the survival of listed species.

Comments on the proposal to list the Jesup's milk-vetch are welcome, and should be sent to the Regional Director, Region 5, (address on page 2 of the BULLETIN), by February 18, 1986.

Hurricanes Damage Southeastern Beach Mouse Habitat

Two Choctawhatchee beach mouse (*Peromyscus polionotus allopheus*) Critical Habitat zones in Walton County, Florida, were hit hard by Hurricanes Elena (in September) and Kate (in November). In Zone 1, the Topsail Hill area, gently-sloped frontal dunes allowed the storm waters' energies to be gradually dissipated with little dune erosion. At Zone 2, including the Gayton Beach State Recreation Area, frontal dunes sustained significant damage. Escarpments of one to six feet high were evidence of serious erosion.

Alabama beach mouse (*P. p. ammobates*) and Perdido Key beach mouse (*P. p. trissyllepsis*) Critical Habitat was lost as Hurricane Elena twice passed offshore near coastal Alabama, then hit Gulfport, Mississippi, on August 30, 1985. In Alabama, estimated top wind speeds were 80 to 103 miles per hour at Gulf Shores and 131 miles per hour at Dauphin Island. The storm surge at Gulf Shores was 8.0 feet, compared to 8.4 feet at Dauphin Island.

Near the tip of Fort Morgan Peninsula, at the western edge of the Alabama

beach mouse habitat, approximately 75 percent of the primary dunes were destroyed. Remaining isolated dunes are separated from the higher relict inland dunes by a water barrier approximately 6 inches deep and 200 yards wide. Beach mice in the isolated primary dunes are subject to greater predation pressure because they now will have to forage over a greater distance, since most of the food source is gone. The tracks of foxes and cats, potential beach mice

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Hurricanes

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predators, were noted, usually leading from one isolated dune to the next. Dune restoration and predator control projects are needed in this area. Twenty percent of the man-made primary dunes east and west of the Gulf State Park Pavillion and 50 percent of the primary dunes in front of the Gulf State Park Resort Motel were destroyed. Water crossed Highway

182 after 20 to 30 percent of the dunes west of the Gulf State Park Fishing Pier were destroyed.

The eastern two-thirds of Perdido Key beach mouse habitat in Alabama received considerable damage. Twenty percent of the primary and all fore dunes were destroyed. Mouse and predator tracks were noted. Dune restoration efforts are needed, especially since this is also an area of high public use. The remaining Perdido habitat in Alabama received relatively minor damage.

In Florida, Perdido Key beach mouse habitat is unoccupied. At the Perdido Key State Preserve, the tide was out and the storm was turning when it reached the preserve. As a result, the fragile dunes were undisturbed, and an additional 50 feet of beach actually accreted. At the eastern end of Perdido Key, the Gulf Islands National Seashore, which was devastated by Hurricane Frederick in 1979, was once again breached by storm water, although the damage was not as significant as in 1979.



Natural dunes in fairly good condition.



Dunes heavily damaged by Hurricane Elena; only a few remnant sea oats remain.

U.S. Delegation Reports on Fifth CITES Conference

by Art Lazarowitz
Federal Wildlife Permit Office

The Fish and Wildlife Service recently published a notice (F.R. 1/10/86) announcing the availability to the public of the *Report of the U.S. Delegation to the Fifth Meeting of the Conference of the Parties to the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES)*.

Sixty-six of the 87 countries that were members of CITES attended the meeting held in Buenos Aires, Argentina, from April 22 to May 3, 1985. Four other countries attended as nonmember observers, as did 5 intergovernmental and 119 nongovernmental organizations. Approximately 500 people participated in the meeting. The conference selected the U.S. to be in charge of the Technical Committee and to be the North American representative on the Standing Committee.

The 10-member U.S. Delegation was led by J. Craig Potter, then Acting Assistant Secretary for Fish and Wildlife and Parks. Rolf L. Wallenstrom, Associate Director, Federal Assistance, was alternate delegation leader. The U.S. Delegation reported that it had achieved substantially all of its objectives in terms of issues involving interpretation and implementation of CITES, and most of

its objectives in terms of proposals to change the list of species controlled by CITES.

Of the 22 issues relating to interpretation and implementation, some of the more noteworthy were:

Significant trade in Appendix II species - The Conference approved a proposal to produce a list consisting of 1) Appendix II (commercially tradable) species known to be detrimentally affected by international trade and 2) Appendix II species for which there is insufficient information to make such a judgment. The list will be produced by the International Union for the Conservation of Nature and Natural Resources' Conservation Monitoring Centre, under a contract with the CITES Secretariat, with input from interested countries where the species are indigenous. The list will serve as a basis for meetings with those countries to help them introduce measures to learn more about the species and to reduce the impact of international trade on them.

Uniform Marking System for ranched specimens - In order to prevent wild specimens from being traded as ranched ones, the Conference adopted a U.S. proposal to mark all products or packages from approved ranches with a standardized mark. Marks would have to include a country code, unique identifi-

cation number, and year of production. Any marks removed during processing would have to be replaced.

Pre-convention certification - The U.S. successfully prevented a move that would have allowed Appendix II specimens in possession at the time of their uplisting to Appendix I to be traded commercially. On another topic related to pre-CITES certification, the Conference recommended that if a specimen was acquired after the date CITES applied to the specimen in the country of import, the country of import could refuse to accept the pre-CITES certificate of the country of export.

Bolivia - In response to complaints by other Latin American countries and by the CITES Secretariat that many illegally traded species were being exported or reexported from Bolivia, the Conference passed a resolution calling on Bolivia to more effectively implement CITES. Apparently in response to this, Bolivia announced to the Conference that it would extend its ban on export of live birds and other animals for an additional 90 days (to terminate in early August 1985). Bolivia stated that the problem of illegal trade was not only its responsibility, but also that of its neighbors and of those countries that import specimens from Bolivia.

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CITES Conference

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The Conference also addressed 96 proposals to effect the listing of plant and animal species. A summary of some of the more important ones follows:

1. Nile crocodile - A proposal by Malawi to transfer the whole species of Nile crocodile (*Crocodylus niloticus*) from Appendix I to Appendix II was one of the more significant issues facing the Conference. It was linked to a resolution to temporarily "relax" criteria for the transfer of certain Appendix I species to Appendix II upon approval of an export quota system. The conference accepted a modified Malawi proposal that allowed transfer of nine national populations of Nile crocodile and imposed export quotas for each population.

2. Narwhal and hooded seal - Proposals by the Federal Republic of Germany to transfer the narwhal (*Monodon monoceros*) from Appendix II to Appendix I, and by Sweden to add the hooded seal (*Cystophora cristata*) to Appendix II, were rejected by the Conference. Although the data on population status appeared to have established a marginal basis for these listings, rejection apparently was based on the active lobbying of Canada and Denmark and on the belief by some that the proposals

represented an ill advised attempt to curtail the harvest of these species.

3. Gyrfalcon - The Conference accepted a joint Denmark - Norway proposal to transfer the North American population of the gyrfalcon (*Falco rusticolus*) from Appendix II to Appendix I, reversing the action of the third meeting of the Conference (New Delhi, 1981), which transferred it from Appendix I to Appendix II. Appendix I status was sought mainly because of recent evidence of illegal trade which, it was argued, could pose a risk to other populations of gyrfalcon. The practical impact on Canada could be significant in view of plans to harvest gyrfalcons in Canada's Northwest Territories.

4. Cranes - A United Kingdom proposal to list the family Gruidae in Appendix II, with the exception of certain species or subspecies already listed in Appendix I, was accepted with the result that seven species are added to those already listed in Appendix II (including one, the sandhill crane, from the U.S.).

5. Saltwater crocodile - Australia and Indonesia proposed to transfer their populations of saltwater crocodiles (*Crocodylus porosus*) from Appendix I to Appendix II in order to allow trade in ranched specimens. The Conference readily accepted the Australia proposal and accepted the transfer of Indonesia's

Irian Jaya population under a quota system.

6. Sea turtles - Proposals to transfer ranched populations of green sea turtles (*Chelonia mydas*) to Appendix II from Appendix I were submitted by France (Reunion population), Suriname, and the United Kingdom (Cayman Islands population). In addition, proposals to transfer national populations of sea turtles to Appendix II were submitted by the Seychelles for hawksbill sea turtles (*Eretmochelys imbricata*) and by Indonesia (for green and hawksbill). The Conference rejected each of these proposals, primarily because it feared that trade could not be limited to the transferred species and would further endanger the wild populations still listed on Appendix I.

7. Australian wildflowers - As an aid to help them establish internal conservation programs, the second Conference (San Jose, 1979) accepted an Australian proposal to add various genera and species of native wildflowers to Appendix II. At the fourth Conference (Gaborone, 1983), Australia sought the removal of these plants from Appendix II, but the Conference only agreed to delist those species supported by data showing that they were not potentially threatened with extinction. At Buenos Aires, the

(continued on next page)

Regulations Proposed for Humane and Healthful Shipment of Wildlife

by Art Lazarowitz

On December 4, 1985, the Fish and Wildlife Service (FWS) proposed to regulate the conditions under which nine groups of animals can be transported into the United States. These animal groups are: nonhuman primates; marine mammals; elephants and ungulates; other large terrestrial mammals; small terrestrial mammals; sloths, bats, and flying lemurs; parrots, pigeons, passerines, and near-passerines; birds of prey; and toucans, hornbills, water birds, and large birds of non-perching habit. The proposed regulations would apply to hybrids of wild animals as well as those that have been born, bred, or raised in captivity. Wild animals that have been domesticated or tamed would also be regulated. Domestic dogs, cats, ruminants, swine, and horses, however, would not be subject to the regulations. Also excluded would be eggs and parts of wild animals, such as blood serum, tissue, and tissue culture.

Since many importers, carriers, and shippers are familiar with 1) the provisions of the Animal Welfare Act governing domestic humane transport of animals, 2) the "Guidelines for Transport and Preparation for Shipment of Live Wild Animals and Plants" developed by countries party to the Conven-

Wildlife Service, 1000 North Glebe Road, Room 611, Arlington, Virginia in Endangered Species of Wild Fauna and Flora, and 3) the "Live Animals Regulations" (guidelines developed by the International Air Transport Association), the FWS used these documents as a base from which to develop the proposed regulations.

If they are made final, the regulations will place responsibility on the carrier to refuse acceptance of animals not fit for transport and animals in containers that do not meet certain minimum standards. The cargo space of vehicles used to transport the animals into the U.S. will have to be constructed to ensure humane and healthful transport, and will have to be kept clean and be maintained to keep out engine exhaust fumes. Dangerous substances will have to be stowed in a manner that will prevent injury or inhumane conditions. While in transit, food and water requirements will have to be met. Terminal facilities for live wild animals will be required to include animal holding areas that are sanitized and that provide sufficient fresh air at appropriate temperatures.

Comments on the proposal are welcome and should be sent to the Federal Wildlife Permit Office, U.S. Fish and

Wildlife Service, 1000 North Glebe Road, Room 611, Arlington, Virginia 22201 by February 3, 1986. (As the BULLETIN went to press, the FWS was considering extending the comment period 30 days.)



photo by Paul Gertler

The yellow-headed amazon (*Amazona ochrocephala*) is one of the most highly traded parrots. Shipment of these birds and many other animals is addressed in the proposed humane transport regulations.

CITES Conference

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Conference agreed to delist the remaining species on the basis of more extensive data and assurances that the domestic programs of research and management would be maintained.

8. Plant parts and derivatives - Article I of CITES distinguishes between parts and derivatives of Appendix I plants and parts and derivatives of Appendix II and III plants, the latter being controlled by CITES only if specifically listed in the Appendices (specification). The problem with specification is that it creates categories of coverage and noncoverage which are either difficult to define (Is a seed a whole plant or a plant part?) or which are subject to manipulation to avoid CITES controls (Is a wooden

plank included in a tree trunk specification?). At Buenos Aires, the Parties formalized a decision made at the previous conference to cover all parts and derivatives of Appendix II plants, with the following exceptions:

(1) seeds, spores and pollen (including pollenia) other than seeds of Cyca-
daceae, Stangeriaceae, and Zamiaceae
species;

(2) tissue cultures and flaked seed-
ling cultures;

(3) cut flowers of artificially propa-
gated Orchidaceae species;

(4) separate leaves, and parts and
derivatives thereof, of naturalized or
artificially propagated *Aloe vera*;

(5) fruits, and parts and derivatives
thereof, of artificially propagated *Vanilla*
orchid species;

(6) parts and derivatives, other than
roots and readily recognizable parts and

derivatives thereof, of American ginseng
(*Panax quinquefolius*); and

(7) fruits, and parts and derivatives
thereof, of naturalized or artificially
propagated Cactaceae species, and
separate stem joints (pads), and parts
and derivatives thereof, of naturalized
or artificially propagated *Opuntia*
species.

A complete report on the outcome of
the 96 proposals addressed at the CITES
conference can be found in the June 14,
1985, *Federal Register*.

Copies of the U.S. Delegation report
may be obtained from the Federal Wild-
life Permit Office, Management Opera-
tions Branch, U.S. Fish and Wildlife
Service, 1000 North Glebe Road, Room
611, Arlington, Virginia 22201. Due to
limited supply, requests for copies of the
report should be limited to one per per-
son or organization.

Regional Briefs

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ened and Endangered southwestern fish
species. Fourteen species currently are
being held at the hatchery. Fish released
into the wild last year included 3,000,000
razorback suckers (*Xyrauchen texa-
nus*), 117,000 Colorado squawfish (*Pty-
chocheilus lucius*), 12,600 bonytail
chubs (*Gila elegans*), and 10,000 Gila
topminnows (*Poeciliopsis occidentalis*).
Another positive note was the detection
of released razorback suckers at four
different locations in Arizona.

The newly formed Desert Fishes Re-
covery Team held its first meeting in
Tempe, Arizona. It will be responsible
for drafting recovery plans for eight
southwestern fish species. The FWS will
also look to the team for advice concern-
ing implementation of recovery actions
for five fish species that are the subject
of completed recovery plans. The team's
area of responsibility will include the
lower Colorado River, Rio Yaqui, and
Gila River basins.

Region 3—The city of Ely, Minnesota, in
St. Louis County has been tentatively
selected for an international wolf center.
This center, which could cost \$3-5 mil-
lion, will increase public knowledge and
appreciation of the controversial timber
wolf (*Canis lupus*) and its complex eco-
system. The Science Museum of Minne-
sota's highly acclaimed "Wolves and
Humans" exhibit, currently on tour
throughout the country, will be a major
feature of the center and will be placed
there permanently.

The international wolf center will offer
people the opportunity to view the wolf
from many perspectives. They will be
able to see its tracks in the wild and hear

its howls in the night. The center will
also call attention to a variety of other
North American carnivores and the
many difficulties associated with their
management and recovery.

The Region 3 Endangered Species
Office staff hosted a meeting of nothern
monkhood (*Aconitum noveboracense*)
researchers and resource managers on
January 22-23 in La Crosse, Wisconsin.
Individuals from the four States (IA, NY,
OH, WI) where the species occurs were
invited to participate. Intensive research
and surveys have greatly increased the
knowledge of the species in the 2 years
since approval of its recovery plan. The
meeting should improve communica-
tion among monkhood specialists and
prioritize remaining recovery needs.

The research team for the Kirtland's
warbler (*Dendroica kirtlandii*) left on
December 11 to conduct winter field
work in the Bahamas, where the birds
will be fitted with radio transmitters.

An exhibit on the reintroduction of the
peregrine falcon (*Falco peregrinus*) was
set up in the main lobby of the regional
office's Federal Building by the Bell
Museum of Natural History during early
December.

Region 4—On October 26, 1985, a
adult male Florida panther (*Felis con-
color coryi*) was hit by a car and killed on
State Road 29 in Collier County, the
same road where four other panthers
have been killed over the past few years.
The incident occurred 3 miles south of
State Road 84, also known as Alligator
Alley, where the animal was found in the
early morning by a fisherman.

This panther had quite a history. It was
first fitted with a radio several years ago
in an area of Big Cypress National Pre-
serve known as Raccoon Point. The cat

then proceeded to move across the pre-
serve and established a new territory in
the Fakahatchee Strand after killing a
male panther that occupied the area.
The animal then proceeded to show an
interest in a female that resided near
Alligator Alley.

At present, there are no known male
panthers remaining south of Alligator
Alley, except for a small population in
Everglades National Park. In an effort to
improve State Road 29, a segment of the
highway north of Alligator Alley is being
widened and relocated about 100 feet to
the west. It is hoped that this will
improve the chances for survival of
animals crossing this segment of the
roadway. Improvements to the
remainder of the highway are planned
for when funds become available.

According to recent newspaper
accounts, 2,850 acres of the Topsail Hill
area in Walton County, Florida, are to be
sold for residential development. Top-
sail Hill is the site of the last remaining
mainland population of the Choctaw-
hatchee beach mouse (*Peromyscus
polionotus alloparys*). Walton County
has approved a zoning density of 35
units per acre for this fragile area.
Although the area is included in a unit of
the Coastal Barrier Resources System, it
is expected that development needing
no Federal subsidies or permits may
occur. Personnel from the Jacksonville
Endangered Species Field Station and
the Florida Game and Fresh Water Fish
Commission met in early December to
discuss the potential impacts of high
density residential development on
beach mouse habitat.

The Gopher Tortoise Council, a group
of professional biologists and other peo-
ple concerned with conservation of the

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Regional Briefs

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gopher tortoise (*Gopherus polyphemus*), met in November at the Solon Dixon Forestry Center in Conecuh National Forest, Alabama. The western population of the gopher tortoise (from the Tombigbee and Mobile Rivers in Alabama to southeastern Louisiana) is scheduled to be proposed for listing as an Endangered species.

Representatives from State and Federal agencies attended the meeting, and management recommendations for longleaf pine forests, the gopher tortoise's primary habitat, were discussed. Some preliminary management principles also were formulated. After these principles are refined, the council will provide them to both public and private land managers. The U.S. Forest Service (USFS) is one major landowner of gopher tortoise habitat, and that agency's biologists are in the early stages of drafting habitat management guidelines for the DeSoto National Forest in Mississippi.

Region 5—The Region 5 staff is in the process of forming two teams to aid in the recovery of the Atlantic Coast population of the piping plover (*Charadrius melodus*) and the northern flying squirrel (*Glaucomys sabrinus*). A draft recovery plan for each species will be prepared sometime during the year.

Region 6—The last session of the Montana Legislature authorized funding to set up the Montana Natural Heritage Program. The program, affiliated with The Nature Conservancy and the Montana State Library, is staffed by a zoologist, botanist, plant ecologist, and data manager. The program will build and maintain a natural heritage data base to inventory and evaluate species diversity in Montana. Information used to build the data base will be collected from species experts, museum collections, and literature citations, and will be verified through field work. The data base, which should be ready for limited use this spring, will be available to all resource agencies in the State. The heritage program also will be extremely beneficial in providing information for the FWS Endangered Species Program in Montana.

Surveys for black-footed ferrets (*Mustela nigripes*) are being conducted in the vicinity of Meeteetse, Wyoming, and will continue through February. As of the end of December, eight black-footed ferrets were in captivity in Wyoming; six were healthy and two were suffering from canine distemper.

A special advisory group of outside experts has been established to provide

guidance to the Wyoming Game and Fish Department and FWS on a captive propagation effort for the ferrets. The group is being chaired by Dr. Ulysses Seal of the Captive Breeding Specialist Group, Survival Services Commission, part of the International Union for Conservation of Nature and Natural Resources (IUCN). Other members include Drs. James Doherty and Mike DonCarlos of the same organization. The group recently visited captive breeding facilities in Wyoming, and recommendations were made on the use of the facilities.

At a December 3, 1985, meeting of the Interagency Grizzly Bear Committee (IGBC), J.S. (Stan) Tixier, Regional Forester of the USFS Intermountain Region, was elected to a 2-year term as Chairman of the IGBC. Tixier succeeds Galen B. Buterbaugh, FWS Regional Director, in Denver, Colorado, who has served in that position since 1983. Dr. Dale Strickland, Assistant Chief of the Game Division, Wyoming Game and Fish Department, was elected Vice Chairman.

The IGBC was established in 1983 to coordinate recovery of the grizzly bear (*Ursus arctos horribilis*), which is listed as a Threatened species in the lower 48 States. It provides a mechanism for all Federal and State agencies with responsibilities for the grizzly to coordinate their management and research activities.

Region 7—Region 7's biologists from the Endangered Species and Ecological Services Divisions met with USFS biologists from two Alaska districts to discuss how USFS management plans might affect two vertebrate species that are candidates for listing, the Prince of Wales flying squirrel (*Glaucomys sabrinus griseifrons*) and the Montague vole (*Microtus oeconomus elymocetes*). Both are unique subspecies endemic to islands where the USFS is the principal land manager. Although neither appears to be in immediate need of protection, the USFS agreed to gather additional status information on these taxa during 1986.

The Aleutian Canada goose (*Branta canadensis leucopareia*) is the only subspecies of the large and successful *B. canadensis* group to once occur in both the North American and Asian continents. A breeding loan of 18 geese was made to two Japanese zoos in 1983, when the wild population that formerly wintered there dwindled to a single individual. We have just learned that Japanese biologists successfully raised several Aleutian geese this summer, and in October, six hatching-year birds were released into the wild at Lake Izunuma, Japan.

Region 8 (Research)—A new whooping crane breeding complex has been completed at the Patuxent Wildlife Research Center (PWRC). The facility consists of 24 large, chain-link pens, each with an automatic watering system, that will be used to house 12 pairs of cranes.

A total of seven Mississippi sandhill cranes (*Grus canadensis pulla*) were sent in late fall from PWRC to the Mississippi Sandhill Crane National Wildlife Refuge in Gautier, Mississippi, for release. This makes a total of 41 cranes that have been sent to the refuge since 1981. Nineteen cranes from previous releases still survive and comprise about 40 percent of the wild flock.

Surveys conducted in Mexico and the southwestern United States during the past three years by the Biological Survey Section of the Denver Wildlife Research Center have documented a reduced number of long-nosed bats at several historical roosting sites. Reasons for the declines remain obscure.

These nectar-feeding bats, *Leptonycteris sanborni* and *L. nivalis*, are migratory and fly northward each spring to maternity roosts in Texas and Arizona as agave flowers emerge. Big Bend National Park in Texas contains the only known roost of *L. nivalis*, and there are still approximately 1,000 animals there in summer. In years past, as many as 5,000 have been recorded in this well-protected roost.

In Arizona, where *L. sanborni* used to occupy many maternity roosts in numbers up to several hundred, there is only a single remaining historical roost housing the bats. Interestingly enough, the bats are frequent visitors to hummingbird feeders in several mountain ranges in southeastern Arizona, which suggests a new method for attracting them for census and study.

Both species winter in Mexico, where there are other populations that remain all year. A complete survey of the known *L. nivalis* roosts in eastern Mexico and those of *L. sanborni* in the west revealed many caves that no longer contain these bats. Long-nosed bats pollinate agave flowers of many species that grow over most of Mexico and the southwestern U.S. The disappearance of these bats might start a spiral of decline in the agaves and the many other species that depend on these plants.

The bat studies were accomplished through funding from the Region 2 Endangered Species Program and with the cooperation of the Dirección General de Flora y Fauna Silvestre of Mexico and the Instituto de Biología at the Universidad Nacional Autónoma de México.

Law Enforcement News

Two Federal court cases involving protected species were concluded recently when sentences were handed down by U.S. District Court Judge Dudley Bowen in Augusta, Georgia. In one case, a Bulloch County farmer was convicted of possessing a southern bald eagle (*Haliaeetus leucocephalus*) in violation of the Bald Eagle Protection Act. He was acquitted, however, of a charge that he killed the eagle. For possession, the man was sentenced to 6 months in prison and ordered to pay a \$2,500 fine. "I don't view this as a simple game violation," Judge Bowen was quoted as saying after the conviction. "I want to put people who mess with eagles behind bars."

The other case centered around the illegal possession and sale of hides from poached alligators (*Alligator mississippiensis*). It was alleged that the alligators were shot in coastal South Carolina, where the species is listed as Threatened. A man from Fife Plantation in Hardeeville, South Carolina, pled guilty to charges of possession and sale of the hides and was sentenced to 3 years in prison (all but 6 months suspended) and active probation for 5 years. He had sold the hides to a retired farmer from Metter, Georgia, who in turn sold them to Fish and Wildlife Service (FWS) undercover agents. Both men were found in violation of the Lacey Act, which prohibits possession, transport, and interstate sale of species taken in violation of other State or Federal conservation laws (in this instance, the Endangered Species Act). The Georgia man also was convicted of selling marijuana. He was sentenced by Judge Bowen to serve 2 years

BOX SCORE OF LISTINGS/RECOVERY PLANS

Category	ENDANGERED			THREATENED			SPECIES* TOTAL	SPECIES HAVING PLANS
	U.S. Only	U.S. & Foreign	Foreign Only	U.S. Only	U.S. & Foreign	Foreign Only		
Mammals	25	20	234	4	0	22	305	23
Birds	60	14	141	3	2	0	220	54
Reptiles	8	6	60	8	4	13	99	18
Amphibians	5	0	8	3	0	0	16	6
Fishes	37	4	11	20	3	0	75	39
Snails	3	0	1	5	0	0	9	7
Clams	23	0	2	0	0	0	25	19
Crustaceans	3	0	0	1	0	0	4	1
Insects	8	0	0	5	0	0	13	10
Plants	86	5	1	23	2	2	119	43
TOTAL	258	49	458	72	11	37	885	220**

* Separate populations of a species, listed both as Endangered and Threatened, are tallied twice. Species which are thus accounted for are the gray wolf, bald eagle, American alligator, green sea turtle, Olive ridley sea turtle, leopard, and piping plover.

** More than one species may be covered by some plans, and a few species have more than one plan covering different parts of their ranges.

Number of Recovery Plans approved: 185

Number of species currently proposed for listing: 26 animals
33 plants

Number of Species with Critical Habitats determined: 92

Number of Cooperative Agreements signed with States: 42 fish & wildlife
17 plants

December 31, 1985

in prison, followed by 5 years of active probation, and to pay restitution to the FWS for the money its undercover agents spent in purchasing the hides.

We Need Your Help

To make this *your* BULLETIN, as well as ours, we need your help. Please send the Editor any comments for improving the format, ideas for articles, photographs, and reports on current research and management activities.

New Publication

Freshwater Mussels of the Upper Mississippi River, a newly published pamphlet intended as an identification aid for common, rare, and endangered species of mussels, is available to interested

agencies and individuals. For copies, contact the Fish and Wildlife Service's Office of Endangered Species at the Federal Building, Fort Snelling, Twin Cities, Minnesota 55111.

January 1986

Vol. XI No. 1

ENDANGERED SPECIES

Technical Bulletin

Department of Interior, U.S. Fish and Wildlife Service
Endangered Species Program, Washington, D.C. 20240

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ENDANGERED SPECIES

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Endangered Species Act Protection Sought for Three Aquatic Animals

MAR 20 1986

U. S. GOVT. PUBLS.

DEPOSITORY 373 7

The Fish and Wildlife Service (FWS) has proposed adding three animal taxa—a snake, a turtle, and a crayfish—to the Federal List of Endangered and Threatened Wildlife, primarily because of threats to their limited aquatic habitat. If the proposals are later made final, Endangered Species Act protection will be extended to the following:

Concho Water Snake (*Nerodia harteri* *paucimaculata*)

The Concho water snake, a subspecies of the Harter's water snake (*Nerodia harteri*), is restricted to sections of the Concho and Colorado Rivers in west-central Texas. Historically, it occurred along 276 river miles, but it has disappeared from 78 miles of former habitat on the upstream end of the range and it now has only a spotty distribution within the rest. The snake's decline is mainly the result of impoundments altering its free-flowing stream and riparian habitat. Because of its low numbers, limited range, and vulnerability to further habitat loss from reservoir construction, the FWS has proposed listing the Concho water snake as Threatened (F.R. 1/22/86).

The only other subspecies of Harter's water snake, the Brazos water snake (*N. h. harteri*), is confined to the Brazos River drainage in Texas, but it is not as rare and is in no apparent danger. Unlike the Concho subspecies, *N. h. harteri* can live in impounded waters, under certain circumstances.

Adult Concho water snakes live in both shallow and deep stream areas, over a variety of substrates, as long as there is enough secure escape cover near their nursery grounds. The adult snakes often are found basking in woody vegetation along the river banks. Juveniles, however, have much more rigid habitat requirements, the two most important features of which are shallow, flowing water over a rocky substrate and the presence of flat rocks along the shore for hiding. Scattered stretches of the Concho and Colorado Rivers with these characteristics still support the snakes.



photo by Norman J. Scott, Jr.

The Concho water snake is a nonvenomous subspecies that rarely exceeds 34.5 inches (90 centimeters) in length.

Concho water snake habitat has been degraded by four large mainstem reservoirs on the Concho and Colorado Rivers, plus several smaller impoundments on tributary streams. Damming streams affects the snake's habitat several ways: above dams, the rocky shoreline needed by the snakes is inundated; below dams, flows are curtailed and the streambed becomes dry or clogged with silt. The silt then supports growths of salt cedar and other vegetation, eliminating the riffle areas required by the juvenile snakes.

From 90 to 99 percent of the Concho water snakes located in recent surveys were concentrated in only 52 percent of the taxon's current range. Stacy Reservoir, a project proposed for the Colorado River, would inundate more than one-half of the primary habitat. An unknown amount of habitat downstream also would be affected, depending on the amount and timing of water releases from the reservoir.

Construction of Stacy Dam and Reservoir would require an authorization permit from the U.S. Army Corps of Engineers (COE) under Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbors Appropriation Act of 1899. If the proposal to list the Concho water snake as Threatened becomes final, the COE will be required under Section 7 of the Endangered Species Act to consult with the FWS on ways to avoid jeopardizing the survival of the snake or adversely modifying its Critical Habitat.

The area proposed as Critical Habitat includes a 45-mile stretch of the Concho River in Tom Green and Concho Counties, extending from a point 5 miles northwest of the town of Veribest downstream to the confluence with the Colorado River. On the Colorado itself, it includes approximately 86 miles in Runnels, Concho, Coleman, and McCulloch

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Regional Briefs

Endangered Species Program regional staffers have reported the following activities for the month of January:

Region 1—The Sea Otter Project Leader, in cooperation with Dr. Marianne Reidman of the Monterey Bay Aquarium, completed a paper on south-

ern sea otters (*Enhydra lutris nereis*) at the request of the National Audubon Society for publication as a chapter in the 1986 *Audubon Wildlife Report*. The paper discusses species description, natural history, historical perspective and current trends, management, recovery goals, and recommendations.

Region 2—An injured whooping crane (*Grus americana*) from the Grays Lake, Idaho, flock was discovered in January near Los Lunas, New Mexico. The cause of injury is unknown, as the bird has not been captured and examined. The crane's lower breast and abdominal plumage were blood-covered for several days, and the bird sat during the daylight hours without feeding. It had difficulty walking and used its outstretched wings to maintain balance; however, it retained its flight ability throughout the recovery period. By the end of January, the crane was substantially improved, although still limping. It was feeding more normally and spending less time resting.

On January 16, two more whooping cranes were discovered on the Texas coast by personnel of Brazoria National Wildlife Refuge (NWR). They were located near the town of Brazoria about 95 miles from Aransas NWR. Both birds hatched in 1984. One is the juvenile that wintered with sandhill cranes (*Grus canadensis*) near El Campo, Texas, last winter, about 40 miles from Aransas. The other wintered on Aransas with its parents last winter. Counting these two whoopers, 96 birds returned to the Texas coast this winter.

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U.S. Fish and Wildlife Service Regions

Region 1: California, Hawaii, Idaho, Nevada, Oregon, Washington, and Pacific Trust Territories. **Region 2**: Arizona, New Mexico, Oklahoma, and Texas. **Region 3**: Illinois, Indiana, Iowa, Michigan, Minnesota, Missouri, Ohio, and Wisconsin. **Region 4**: Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, South Carolina, Tennessee, Puerto Rico, and the Virgin Islands. **Region 5**: Connecticut, Delaware, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, Vermont, Virginia, and West Virginia. **Region 6**: Colorado, Kansas, Montana, Nebraska, North Dakota, South Dakota, Utah, and Wyoming. **Region 7**: Alaska.

The *ENDANGERED SPECIES TECHNICAL BULLETIN* is published monthly by the U.S. Fish and Wildlife Service, Department of the Interior, Washington, D.C. 20240.

Region 3—A meeting attended by 20 people associated with the recovery of the northern monkshood (*Aconitum noveboracense*) was held at the National Fishery Research Laboratory in LaCrosse, Wisconsin, on January 22 and 23. The meeting provided the attendees with information on current monkshood research projects, upcoming research, protection, and the plant's current status.

It was the consensus of the group that a recovery team should be formed and the current recovery plan updated. They decided that the recovery team will consist of a member from each State in which the monkshood exists (IA, NY, OH, WI) and two or three persons from the research community. A recovery plan update is scheduled to be completed by the beginning of the 1987 field season.

On January 23, a meeting of Wisconsin freshwater mussel experts, commercial clammers, and shell buyers also was held in LaCrosse. The purpose of the meeting was to gather information on species in need of protection and to discuss proposed State clamming regulations.

The Mingo NWR in Puxico, Missouri, hosted "Eagle Days" on January 18 and 19. Activities included films, talks about eagles, an appearance by a captive bald

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Two Plants Given Final Endangered Species Act Protection

In January, the following two plants were added to the U.S. List of Endangered and Threatened Plants:

Cochise Pincushion Cactus

The Cochise pincushion cactus (*Coryphantha robbinsorum*) is a small, unbranched cactus with pale yellow-green, bell-shaped flowers that appear in March and April. This cactus is known to occur in Cochise County, Arizona, on an active cattle ranch that is comprised of State and privately owned lands. A population has also been reported in adjacent Sonora, Mexico, but no further studies have been conducted there.

On March 6, 1985, the cactus was proposed for listing as a Threatened species due to destruction of its limited habitat from livestock grazing, soil disturbance, and erosion, and because of direct destruction of plants by trampling. (See BULLETIN Vol. X No 4.) While overgrazing is not now a serious problem, and the ranch owners are conservation oriented and sympathetic to the species' survival, a future change in ranch management could lead to rapid habitat deterioration.

Collecting also poses a serious threat to *C. robbinsorum*, not only because of its beauty and uniqueness, but because of its extremely concentrated location. More than half of the Cochise pincushion cactus' total population is located on less than 4 percent of its total range, making the species very vulnerable to commercial exploitation. In addition, this plant has a much lower reproductive potential than most other cacti, averaging an estimated annual production of 3 fruits with 20 seeds each per plant.

After carefully assessing all the information available concerning the threats facing *C. robbinsorum*, the FWS listed the species in a January 9, 1986, final

rule. Due to the plant's restricted distribution, accessibility, and attractiveness to cactus collectors, Critical Habitat was not designated for the Cochise pincushion cactus. Nevertheless, its habitat will still be protected under the provisions of Section 7 of the Endangered Species Act.

Lana'i Sandalwood or 'Iliahi

Known from two areas on the island of Lana'i in the Hawaiian Islands, the Lana'i sandalwood (*Santalum freycinetianum* var. *lanaiense*) is a small, gnarled tree that bears small clusters of bright red flowers. Only 39 individuals of this variety are known to exist. These remaining plants are divided into two populations, one near Kanepu'u and the other near the summit of the island. Both populations occur on private lands owned by Castle and Cooke, Inc., living in habitats ranging from dry lowland forests on well-drained, barren soils to mesic forests on shallow soils.

Extensive removal of Hawaiian sandalwoods, valued for their fragrance and beauty, for trade occurred from 1790 to 1820. This trade took place prior to the scientific community's discovery of the Lana'i sandalwood and could have previously reduced the number of trees. More recent population declines, however, are largely due to loss of habitat. Natural vegetation has been eliminated over vast areas of Lana'i, and native dryland forests have been severely degraded. Agricultural development, first for pasture and later for pineapple production, has removed large tracts of the native vegetation. Cattle, sheep, and axis deer, which were all introduced into the area, have removed and trampled vegetation, contributing to severe erosion of soils. Another serious threat to the taxon is predation of its fruits by

accidentally introduced rats, resulting in a virtual lack of reproduction.

Because of the Lana'i sandalwood's great vulnerability to extinction, the FWS proposed to list it as Endangered on March 6, 1985. (See story in BULLETIN Vol. X No 4.) The January 24, 1986, final rule now gives this Hawaiian rarity a better chance to survive.

A formal Critical Habitat designation was not part of the final listing rule. Although this species is no longer common enough for profitable commercial use, the Lana'i sandalwood could be threatened by individuals seeking the wood for its decorative and fragrance values. Publication of the required maps and descriptions that are part of a Critical Habitat designation would make the species even more vulnerable to collection. However, Section 7 provisions will apply for this plant.

Available Conservation Measures

Among the conservation measures that are now available to both the Cochise pincushion cactus and the Lana'i sandalwood are a requirement for the FWS to develop and implement plans for their recovery, possible Federal funding for State conservation programs, and prohibitions against certain practices.

Under Section 7 of the Endangered Species Act, Federal agencies are required to ensure that any actions they fund, authorize, or carry out are not likely to jeopardize the survival of any listed species. In addition, interstate and international trafficking in listed plants is prohibited, except under permit. For the Cochise pincushion cactus, which is listed as Threatened, properly documented seeds of cultivated specimens are exempt from this prohibition.

Ban on Condor Removal Extended

The National Audubon Society has won a Federal district court injunction barring the FWS from removing the last five California condors (*Gymnogyps californianus*) from the wild. This ruling extends the ban first imposed on January 9, 1986, through a temporary restraining order.

Six wild condors disappeared last winter, and another died January 18, 1986, several days after its capture, despite the efforts of veterinarians to treat

the bird for severe lead poisoning that it had incurred in the wild. The FWS had intended to bring the five remaining wild condors into captivity until the reasons for their continuing decline are discovered and resolved. They were to be used in the captive propagation program, through which the FWS hopes to produce young condors for release into the wild.

The FWS remains committed to the long-term goal of establishing a secure,

self-sustaining population of California condors in the wild. Temporary capture of wild condors, as needed for replacement of radio-tracking equipment and for tissue sampling, was not affected by the court decision.

Because the risks to the remaining wild condors have not changed, the Department of the Interior intends to appeal the injunction.

Three Aquatic Animals

(continued from page 1)

Counties, extending from a bridge near the town of Maverick downstream to the confluence of the Colorado River and Salt Creek. The proposed Critical Habitat designation also includes the banks of both rivers up to a height of 15 vertical feet above the water level at median discharge. These areas encompass 95 percent of the known surviving Concho water snakes; however, snakes and their habitat found outside the designated Critical Habitat also would receive protection.

The Harter's water snake, including both the Concho and Brazos subspecies, is listed as endangered by Texas, which controls collecting, possession, and sale. State law, however, does not protect the species' habitat. A Federal listing of the Concho water snake as Threatened would provide protection from harmful effects of Federal activities while reinforcing Texas law as it relates to the take and trade of this subspecies.

Comments on the proposal to list the Concho water snake as Threatened are welcome from all interested agencies, organizations, and individuals, and should be sent to the Regional Director, Region 2 (address on page 2 of the BULLETIN), by March 24, 1986.

Ringed Sawback Turtle (*Graptemys oculifera*)

Another reptile facing habitat loss from water management projects is the

ringed sawback turtle. This species is found only in the Pearl and Bogue Chitto Rivers of southern Mississippi and Louisiana. Some of its former habitat already has been modified by reservoir construction and flood control projects, while other areas have become marginal habitat, apparently due to water pollution impacting the turtle's molluscan food supply. Most of its remaining habitat is subject to modification from further flood control projects. In light of these factors, the FWS has proposed listing the ringed sawback turtle as a Threatened species (F.R. 1/22/86).

Ringed sawback turtle habitat is typically riverine with a moderate current and good water quality. The river must be wide enough to allow sun penetration for several hours, and it should contain numerous logs for basking and protection from predators. Large, high sand and gravel bars adjacent to the river are necessary for nesting. Although habitat apparently suitable for the ringed sawback turtle exists to the west of the species' known range, surveys have failed to produce any specimens from outside the main channels of the Pearl and Bogue Chitto Rivers. The ringed sawback turtle is already listed by Mississippi under State law as endangered.

Approximately 21 percent of the turtle's former range in the Pearl River already has been affected by an impoundment and several flood control projects, and others planned or authorized by the COE would have an impact on up to 28 percent of the remaining Pearl River habitat. Further, the Bogue Chitto River would be completely eliminated as suitable habitat for the ringed sawback turtle by an authorized channelization project on that system.

Ringed sawback turtles are unable to survive in large lakes or polluted water. Impoundments obviously eliminate turtle habitat by inundation. Flood control and navigation channel modifications can remove basking and nesting sites, change water flows, and increase turbidity to the detriment of snails and other mollusks eaten by the turtle. Drainage ditches and other watershed control structures can degrade water quality also by funnelling silt and pesticides from agricultural fields into the rivers.

Because ringed sawback turtle numbers have declined, the impacts of wanton shooting (use of basking turtles for target practice) and collecting for the pet trade are becoming more serious. This very attractive turtle has been advertised for sale at \$65 each. Because of the threat from collectors, the FWS decided not to pinpoint the location of surviving populations by proposing a designation of Critical Habitat. Nevertheless, if the turtle is listed, Federal agencies whose activities may affect it will be required to consult with the FWS on ways to avoid jeopardizing the species while meeting project objectives. Federal actions expected to affect the species include COE flood control and navigation projects, certain activities needing COE permits, and Soil Conservation Service watershed projects.

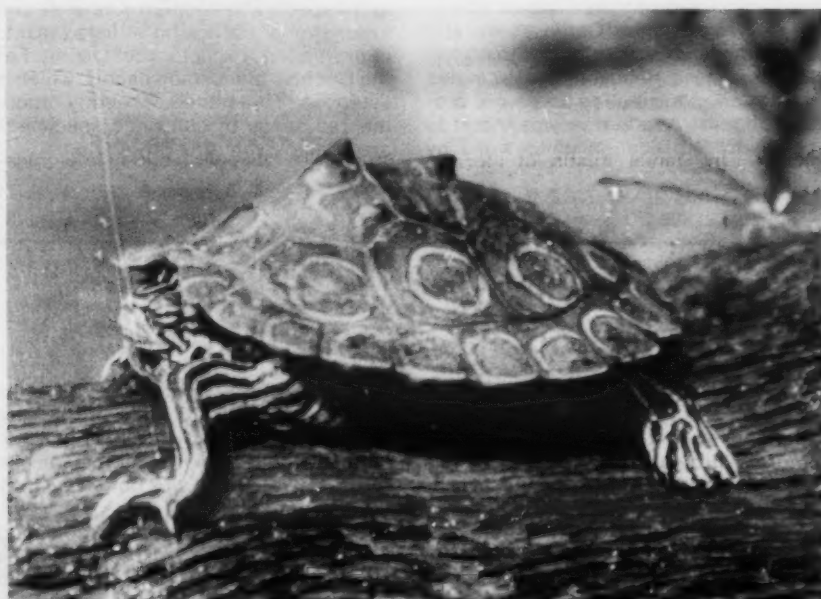
Comments on the proposal to list the ringed sawback turtle as a Threatened species are welcome, and should be sent to the Endangered Species Field Station, U.S. Fish and Wildlife Service, Jackson Mall Office Center, Suite 316, 300 Woodrow Wilson Avenue, Jackson, Mississippi 39213 by March 24, 1986.

Nashville Crayfish (*Orconectes shoupi*)

Another animal imperiled by degradation of its aquatic habitat is the Nashville crayfish, which survives only within the Mill Creek basin in Davidson and Williamson Counties, Tennessee. Recent surveys failed to locate the species in three other watersheds, the Elk, Harpeth, and Cumberland River systems, where it historically had been collected. The species' remaining habitat in Mill Creek and five of its tributaries faces threats from stream alterations and a general deterioration of water quality.

In a 1981 report, the COE stated that "biological communities inhabiting Mill Creek during the 1981 survey indicated water of fair to very poor quality and the influence of moderate to extensive enrichment and disturbance." The lower part of the watershed lies within the highly urbanized Nashville metropolitan area, and water pollution is an increasing problem. Although the upper watershed has less residential and urban development, silt and pesticides

(continued on next page)



Prominent vertebral spines on the upper shell or carapace of the ringed sawback turtle are one of this species' distinctive characteristics.

Three Aquatic Animals

(continued from previous page)

from agricultural runoff also degrade the aquatic ecosystem.

The Nashville crayfish also faces potential threats from a flood protection project being planned by the COE. This project could involve the construction of two dry flood control dams that could, depending on project design, damage the habitat by altering stream flows, water temperature, and silt loads during the construction and operational phases.

Because crayfish of other species are frequently taken in the southeast for food and bait, the FWS decided not to increase the vulnerability of the Nashville crayfish by delineating its Critical Habitat. If it is listed, however, the species' habitat will receive protection from any adverse effects of Federal activities. For example, the COE would be



photo by Dick Biggins

The Nashville crayfish can attain a length of over 6 inches (15 cm). Like most other crayfish species, it probably feeds on fragments of vegetation and animal matter.

required to consult with the FWS on its flood control program.

Comments on the proposal to list the Nashville crayfish as an Endangered species are welcome, and should be sent to the Field Supervisor, Asheville Endangered Species Field Station, U.S. Fish and Wildlife Service, 100 Otis Street, Room 224, Asheville, North Carolina 28801 by March 25, 1986.

Available Conservation Measures

If the proposals to list these animals as Endangered or Threatened become final, all three species will receive protection under the Endangered Species Act. Among the conservation measures provided by the Act are: prohibitions on take, possession, and trafficking in these species without a Federal permit; protection from Federal activities that could jeopardize survival; the requirement for the FWS to develop and implement recovery plans; and the possibility of Federal aid to State endangered species programs.

Regional Briefs

(continued from page 2)

eagle named Omega from the Dickerson Park Zoo in Springfield, and viewing our national symbol in the wild. Eagle Days were co-sponsored by the FWS and the Missouri Department of Conservation.

In the December 1985 BULLETIN (Vol. X No. 12), Region 3 reported that the Consolidated Grain and Barge Company of St. Louis, Missouri, had requested an exemption from the requirements of Section 7 of the Endangered Species Act for establishment of a barge fleeting area on the Ohio River. In January, Consolidated Grain and Barge formally withdrew its exemption application for the barge project.

A full authorities plant Cooperative Agreement as authorized under Section 6 of the Endangered Species Act has been signed between the State of Iowa and the FWS. Cooperative Agreements with Indiana, Ohio, and Missouri, also for the conservation of plants, are nearing completion.

Region 4—The Caribbean Field Office in Puerto Rico has received a petition from the Caribbean Islands National Wildlife Refuges to list the Puerto Rico and U.S. Virgin Islands population of the white-cheeked pintail (*Anas bahamensis*) as Threatened. Once considered to be Puerto Rico's most abundant and widespread waterfowl species, the pin-

tail has experienced an islandwide population decline since the 1950's due to hunting pressure and habitat destruction. By 1967-68, Flamenco Lagoon on Culebra Island was the only site where pintails could be found regularly and in significant numbers. The Commonwealth of Puerto Rico listed the species as endangered on its list of rare and endangered animals in 1973 and hunting of this bird was prohibited in 1976. Subsequent band recoveries indicate that illegal hunting continues despite this protection. Only 200 to 300 white-cheeked pintails, thought to be a distinct population unit, are estimated to remain in Puerto Rico.

In an article published in *Palmetto*, the newsletter of the Florida Native Plant Society, Dr. Daniel Austin of Florida Atlantic University reported that one of Florida's plant candidates for listing as Endangered or Threatened appears not to be a valid taxon. The climbing dayflower (*Commelina gigas*) was described by John Kunkel Small in 1933 from hammocks in the Lake Okeechobee region, where it was a vigorous, healthy plant that was frequently eaten by cattle. Dr. Austin searched for this dayflower for the FWS in 1980-81. Recently, he has been able to examine a large number of specimens of the variable tropical weed, *Commelina diffusa*, which has become widespread in the United States. The specimens that had been assigned to *C. gigas* turn out to be indistinguishable from robust *C. diffusa*. FWS will consider Dr. Austin's findings and may drop the plant from further listing consideration.

The Jackson, Mississippi, Endangered Species Field Station coordinated a survey of the interior population of the least tern (*Sterna antillarum*) in the lower Mississippi River Valley during June and July 1985. The survey covered the Mississippi River from the Missouri line downstream to Baton Rouge, Louisiana; the Arkansas River from the Oklahoma/Arkansas State line to its confluence with the Mississippi River; and the Red River across Louisiana to its confluence with the Mississippi.

Twenty-one colonies were confirmed or suspected on the Mississippi River from the Missouri/Arkansas State line downstream to Rosedale, Mississippi, a distance of 235 miles. Approximately 1,240 interior least terns were observed on this stretch of river. Farther south along the Mississippi, 60 interior least terns were observed but no colonies were located. Four interior least tern colonies containing 76 terns were observed along the Arkansas River. No terns were observed on the Red River.

The Jackson Endangered Species Field Station is conducting a status review on the Caddo Mountain salamander (*Plethodon caddoensis*), a vertebrate listing candidate that is known to occur only in the Caddo Mountain range of the Quachita Mountains in Polk and Montgomery Counties, Arkansas. Most of the occupied habitat is within Quachita National Forest.

Herpetologists have previously documented that this salamander survives hot, dry summers by burrowing under ground. Recent investigations by the

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Research Summary: Flattened Musk Turtle

by C. Kenneth Dodd, Jr.
DWRC-Gainesville, Florida

The flattened musk turtle (*Sternotherus depressus*), recently proposed as Threatened (see BULLETIN Vol. X No. 12), is confined to the Black Warrior River basin in northern Alabama. The turtle has declined from a combination of factors, principally from habitat degradation and commercial collecting. From April through September 1985, Denver Wildlife Research Center (DWRC) biologists studied the distribution and abundance of this species at 10 sites, 5 of which were affected by mining. In addition, data were gathered on movements, habitat use, morphology, basking behavior, growth, and the use of turtles by leeches.

Nearly 28,000 trap-hours yielded 490 individual turtles and 222 recaptures: 77

percent of the turtles were collected at one site. The sex ratio of 1.5:1 was skewed toward males. Very few turtles, nearly all old adults, were found in areas affected by mining. In addition, a substantial number of turtles at the only known large population was found to have pneumonia, which has generally proven fatal to the animals.

In addition to providing baseline data on the size and structure of turtle populations in different rivers, this study, using radio telemetry, showed that flattened musk turtles use a variety of cover sites and exhibit individual preferences in cover site selection. The turtles rarely moved over 30 meters, though they occasionally undertook long distance movements for short periods of time before returning to a favored cover site. DWRC scientists also were able to confirm that this turtle basks, and that a majority of basking turtles have pneu-

monia; however, the cause of the disease remains unknown.

Though mining certainly has affected populations of the flattened musk turtle, siltation from other sources continues to pose a substantial threat to the species. In addition, commercial collecting is still serious at some locations, and certain populations now reflect such collecting pressure in their size class distribution. Finally, the fragmentation of remaining populations by unfavorable habitat, thus restricting gene flow and making small populations subject to inbreeding and increased risk from a catastrophic event, could pose a long-term threat to the turtle's survival.

The data gathered last summer added substantially to the knowledge of the biological requirements of this species, and should prove valuable in planning for its conservation. The study was funded by the Office of Surface Mining, Department of the Interior.

Recovery Plan Update

The following recovery plans were recently approved: *Fat Pocketbook Pearly Mussel Recovery Plan* (10/4/85); *Salt Marsh Bird's-beak Recovery Plan* (12/6/85); and *Lotis Blue Butterfly Recovery Plan* (12/26/85). Summaries will appear in future issues of the BULLETIN.

Copies of recovery plans become available for purchase about 6 months from their date of approval. Requests for copies should be made to the Fish and Wildlife Reference Service, 6011 Executive Boulevard, Rockville, Maryland 20852; telephone 800/582-3421.

Updated List Available

The *Federal List of Endangered and Threatened Wildlife and Plants*, updated to January 1, 1986, is now available. It incorporates all changes to the list since the last compilation (October 1, 1985), as published in 50 CFR 17.11 and 17.12. The 30-page document can be ordered from the Publications Unit, 148 Matomic, U.S. Fish and Wildlife Service, Washington, D.C. 20240.



flattened musk turtle habitat in the Black Warrior River basin

photo by C. Kenneth Dodd, Jr.

Withdrawal of Proposed Rule to List Trispot Darter

On January 3, 1986, the FWS withdrew a rule published in the July 13, 1984, *Federal Register* that had proposed listing the trispot darter (*Etheostoma trisella*) as an Endangered species with Critical Habitat. New data received by the FWS indicate that this fish is more widespread than thought at the time of the proposal and that it is not considered likely to become Endangered or Threatened in the foreseeable future.

The trispot darter was proposed for Endangered Species Act (ESA) protection concurrently with two other fish species, the amber darter (*Percina antesella*) and the Conasauga logperch (*P. jenkinsi*). (See story in BULLETIN Vol. IX No. 8.) On August 5, 1985, the amber darter and Conasauga logperch were listed as Endangered with Critical Habitat. In that final rule (see BULLETIN Vol. X No. 9), it was explained that a decision

on listing the trispot darter would be delayed due to substantial disagreement about the accuracy of available data relating to the listing determination.

When the trispot darter was proposed for listing, it was known from two populations, one in the Conasauga River and the other in Coahulla Creek, both located in areas encompassing parts of Georgia and Tennessee. Subsequently, the Georgia Department of Natural Resources located two additional populations and found the fish further downstream in the Conasauga River than was previously known. Based on this information, the FWS believed that the trispot darter might still qualify for Threatened status; however, it also believed that the new information created conflicting opinions about the species' status. The FWS then funded additional surveys to

assist in making the determination, and after their completion, found five existing trispot populations. In addition, trispot darter specimens were collected in creeks, which suggests that the species is not restricted to large rivers as previously believed. Many creeks not yet surveyed exist in the range of the species, and there is a possibility that they may also harbor populations of *E. trisella*. Furthermore, most of the habitat occupied by these populations is in stable, rural areas that are not experiencing rapid development.

After reviewing all the currently available biological information, the FWS is convinced that the trispot darter does not warrant protection under the ESA. However, if new information becomes available that indicates otherwise, the species could again be proposed for listing.

Regional Briefs

(continued from page 5)

U.S. Forest Service (USFS) of abandoned mines in the Quachita Mountains discovered large aggregations of Caddo Mountain salamanders in two mines during the summer months. The largest reported aggregation of this species, over 100 individuals, was documented from one of the mines. Future investigations could reveal that these mines also provide breeding habitat. Protective measures for the mine habitat are being investigated by the FWS and USFS.

Region 5—A Section 7 nationwide consultation under the Endangered Species Act was conducted for the Environmental Protection Agency (EPA) on the use of the pesticide Diazinon on golf courses and sod farms. The Endangered Hawaiian goose (*Nesochen sandvicensis*) and Mohave tui chub (*Gila bicolor mohavensis*) were found to be adversely affected by this pesticide. A report was submitted to EPA.

Regional Director Howard Larsen appointed a recovery team for the Atlantic population of the recently listed piping plover (*Charadrius melodus*). Dick Dyer of the Region 5 staff will serve as team leader. Mr. Larsen also appointed a recovery team for the northern flying squirrel (*Glaucomys sabrinus*) with Ken

Knight, West Virginia Wildlife Resources Division, as team leader.

Region 6—In spring 1984 and fall 1985, an informal working group gathered in Jackson, Wyoming, to discuss the status and characteristics of the Gray's Lake whooping crane population, to encourage interstate cooperation in managing and monitoring cranes, and to discuss strategies for Section 7 consultation involving cranes. The post-migration spring dispersal of cross-fostered cranes from the Gray's Lake experiment into other habitats in Idaho, Wyoming, Colorado, Utah, and Montana illustrates the need for consultations that would enhance the establishment of a viable population of whooping cranes in the Rocky Mountain region.

The fall 1985 meeting focused on impacts of energy-related developments on cranes, status of the population, implementation of the whooping crane contingency plan, rapid reporting of crane sightings to Gray's Lake experiment project leader Rod Drewien, and responsibilities of recovery coordinator Jim Lewis (Region 2). The group also discussed the idea of involving a wide spectrum of agencies and private interests from the five States surrounding the Gray's Lake experiment in the work group next year.

Members of this year's group plan to draft a Whooping Crane Information and Section 7 Assessment Handbook for review by those invited to the next meeting in Jackson. Federal and State

biologists and other natural resources professionals will need to address the effects of a variety of development projects and other land management operations on the survival and recovery of whooping cranes, while the FWS awaits the first successful pairing and breeding of the whoopers produced via the Gray's Lake experiment.

The two black-footed ferrets (*Mustela nigripes*) that were reported last month as being sick have died of canine distemper, one at the end of December and the other in early January. The remaining six ferrets in captivity, two males and four females, are healthy. The animals are being immunized with a killed distemper vaccine, and blood sampling indicates that immunity has been established. An attempt will be made to breed the ferrets in February and March 1986; however, since both males are immature, the probability of success is considered poor. Ferret surveys will continue as weather permits through February and March.

The FWS and the Commissioners of the Wyoming Game and Fish Department have approved funding for a captive breeding facility to be located 45 miles northeast of Laramie, Wyoming. Construction is expected to begin this spring.

The Survival Services Commission from the International Union for Conservation of Nature and Natural Resources (IUCN) captive breeding advisory group

(continued on next page)

Regional Briefs

(continued from previous page)

met January 17-19, 1986, in Laramie, Wyoming. It was agreed that Mike Don-Carlos, Minnesota Zoological Gardens, will work with the captive breeding program for one month, and Reinhardt Wuestenberg will be available for one week. The group will continue to advise and assist the Wyoming Game and Fish Department with efforts to recover the black-footed ferret.

Region 8 (Research)—Patuxent Wildlife Research Center (PWRC) investigators have spotted four Kirtland's warblers (*Dendroica kirtlandii*) in the Bahama Islands since the beginning of the field season in early December. On Eleuthera Island, a female and banded male were observed together where the male was banded last winter. Feeding and habitat use data have been collected. On Turk's Island, a male and female also have been observed where Kirtland's warblers were seen last year. The study evaluates the winter range and limiting factors of the Kirtland's warbler on its wintering grounds.

Eight Florida sandhill cranes (*Grus canadensis pratensis*) from the PWRC were shipped to the Mississippi Sandhill Crane NWR in Gautier, Mississippi, on January 2. During the upcoming breeding season, these birds will serve as fos-

BOX SCORE OF LISTINGS/RECOVERY PLANS

Category	ENDANGERED			THREATENED			SPECIES* TOTAL	SPECIES HAVING PLANS
	U.S. Only	U.S. & Foreign	Foreign Only	U.S. Only	U.S. & Foreign	Foreign Only		
Mammals	25	20	234	4	0	22	305	23
Birds	60	14	141	3	2	0	220	54
Reptiles	8	6	60	8	4	13	99	18
Amphibians	5	0	8	3	0	0	16	6
Fishes	37	4	11	20	3	0	75	39
Snails	3	0	1	5	0	0	9	7
Clams	23	0	2	0	0	0	25	20
Crustaceans	3	0	0	1	0	0	4	1
Insects	8	0	0	5	0	0	13	11
Plants	87	5	1	23	3	2	121	44
TOTAL	259	49	458	72	12	37	987	223**

* Separate populations of a species, listed both as Endangered and Threatened, are tallied twice. Species which are thus accounted for are the gray wolf, bald eagle, American alligator, green sea turtle, Olive ridley sea turtle, leopard, and piping plover.

** More than one species may be covered by some plans, and a few species have more than one plan covering different parts of their ranges.

Number of Recovery Plans approved: 188

Number of species currently proposed for listing: 29 animals
31 plants

Number of Species with Critical Habitats determined: 92

Number of Cooperative Agreements signed with States: 45 fish & wildlife
23 plants

January 31, 1986

ter parents for Mississippi sandhill crane (*G. c. pulla*) eggs and chicks that have been abandoned by parents or are in danger of being lost to predators. In the

past, such eggs and chicks were shipped to the PWRC for incubation and/or foster care.

February 1986

Vol. XI No. 2

ENDANGERED SPECIES

Technical Bulletin

Department of Interior, U.S. Fish and Wildlife Service
Endangered Species Program, Washington, D.C. 20240

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Vol. XI No. 3

ENDANGERED SPECIES

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Technical Bulletin

 Department of Interior, U.S. Fish and Wildlife Service
 Endangered Species Program, Washington, D.C. 20240

Final Endangered Listings Approved for Two Species

During February 1986, two rare taxa—a subspecies of falcon and a freshwater wetland plant—were added to the Federal List of Endangered and Threatened Wildlife and Plants. Endangered Species Act protection is now available for the following:

Northern Aplomado Falcon (*Falco femoralis septentrionalis*)

An apparently non-migratory bird of prey, the northern aplomado falcon once could be found in southeastern Arizona, southern New Mexico, southern Texas, much of Mexico, and the western coast of Guatemala. It is now extirpated as a breeding species in the United States, primarily as a result of habitat modification, and it is currently known to nest only in parts of eastern Mexico. The survival of this subspecies is jeopardized by continuing habitat modification and by environmental contamination from pesticides. These threats prompted the FWS to propose on May 20, 1985, to list the northern aplomado falcon as Endangered. (See story in BULLETIN Vol. X No. 6.) On February 25, 1986, the final listing rule was published.

Typical northern aplomado falcon habitat is open rangeland and tropical savanna, characteristics that expose prey species and provide nesting sites for the bird. Widespread encroachment of this habitat by brushy plants, such as creosote and mesquite, eliminated the northern aplomado falcon from the U.S. and continues to be a limiting factor for the bird throughout its remaining range. The main threat today, however, is the use of persistent organochlorine pesticides like DDT, which enter the falcon's food chain and result in eggshell thinning and reproductive failure. Although DDT application is prohibited in the U.S., the chemical is still used within parts of the falcon's range south of the U.S.

Canby's Dropwort (*Oxypolis canbyi*)

This perennial plant, a member of the parsley family (*Apiaceae*), grows up to
(continued on page 12)



photo by Steve Dubrott

The northern aplomado falcon is one of our most colorful birds of prey. "Aplomado" is Spanish for gray or lead colored. Adults are characterized by a gray dorsum, rufous underparts, a long and banded tail, and a distinctive black and white facial pattern.

ENDANGERED SPECIES TECHNICAL BULLETIN Vol. XI No. 3 (1986)

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Regional Briefs

Endangered Species Program regional staffers have reported the following activities for the month of February:

Region 1—In a conference report under Section 7 of the Endangered Species Act, the Laguna Niguel, California, Field Office identified impacts to a population of the least Bell's vireo (*Vireo bellii pusillus*). The conference involved

the proposed flood control project on the San Luis Rey River in the city of Oceanside, San Diego County, California. It would have likely extirpated the San Luis Rey River population of the least Bell's vireo, and would have also resulted in destruction and adverse modification of proposed Critical Habitat for the species.

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U.S. Fish and Wildlife Service Regions

Region 1: California, Hawaii, Idaho, Nevada, Oregon, Washington, and Pacific Trust Territories. **Region 2:** Arizona, New Mexico, Oklahoma, and Texas. **Region 3:** Illinois, Indiana, Iowa, Michigan, Minnesota, Missouri, Ohio, and Wisconsin. **Region 4:** Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, South Carolina, Tennessee, Puerto Rico, and the Virgin Islands. **Region 5:** Connecticut, Delaware, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, Vermont, Virginia, and West Virginia. **Region 6:** Colorado, Kansas, Montana, Nebraska, North Dakota, South Dakota, Utah, and Wyoming. **Region 7:** Alaska.

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The FWS has released a draft management plan for the least Bell's vireo that was developed by the Sacramento, California, Endangered Species Office (SESO) in cooperation with the Division of Ecological Services at Laguna Niguel. Approximately 70 interested parties, including Federal agencies, local governments, developers, and conservation organizations, have been asked to provide comments on the plan. The objectives of the plan are to protect, secure, and manage at least 20,000 acres (8,065 ha) of least Bell's vireo habitat distributed in 12 existing management areas, and in other historical breeding locations in southern and northern California. The goal is to provide for the maintenance of a minimum of 5,000 breeding pairs.

Recent water quality problems significantly reduced the Endangered Mohave tui chub (*Gila bicolor mohavensis*) population at Soda Springs in San Bernardino County, California. The Bureau of Land Management's (BLM) dredging of Lake Tuendae in December 1985 may have contributed to the problems. This decrease has serious implications for the fish's recovery program.

The Olympia, Washington, Field Office participated in the wintering bald eagle (*Haliaeetus leucocephalus*) communal night roost survey on the Skagit River. Two suspected roost sites have been verified and are being monitored. Surveys will continue into March.

The Boise, Idaho, Field Office completed a Memorandum of Agreement with the Idaho Natural Heritage Program for data exchange. The FWS may now access the Heritage Program data base and obtain documents for Federal projects.

The recovery coordinator at the Honolulu, Hawaii, Field Office presented a paper at the Western Section of the Wildlife Society's annual meeting in Reno, Nevada, on the effects of feral ungulates on forest birds in Hawaiian rain forests. It included management recommendations for maintaining and enhancing forest bird habitats, and for developing strategies to control feral ungulates.

The regional office completed a biological opinion for BLM's Umpqua River Corridor Habitat Management Plan (HMP). The HMP proposes to set aside approximately 3,200 acres of BLM administered lands along this Oregon river to implement habitat improvement measures, reduce human disturbance, and conduct a monitoring program.

(continued on page 7)

Endangered Plants of Our Caribbean Islands: A Unique Flora Faces Unique Problems

by
David Densmore
FWS Caribbean Field Office
Boqueron, Puerto Rico

During the nearly 500 years since the arrival of Christopher Columbus, Puerto Rico and the Virgin Islands have undergone enormous and, in many cases, irreversible changes. As with island systems elsewhere in the world, this group has proved vulnerable to the alterations and introductions that accompanied settlement by Europeans. The islands' flora has been significantly affected and, until recently, was unprotected by Federal law.

Puerto Rico, although geographically a part of the Greater Antilles, is geologically connected to the Virgin Islands (both U.S. and British). Together they form the Puerto Rican Bank, a group of volcanic islands, islets, and rocks projecting from a submerged shelf surrounded by deep Atlantic and Caribbean waters. The islands are also floristically related; nearly all of the plant species present on the Virgin Islands also occur in Puerto Rico.

Puerto Rico, having the greatest geologic, topographic, and climatic variation of the U.S. Caribbean islands, displays the highest plant diversity and endemism (i.e., restriction to one locality). More than 3,000 plant species, of which 234 (8 percent) are endemic, occur within its 3,500 square miles. Among approximately 550 tree species, the rate of endemism is considerably higher (26 percent). Although the insular tropical and subtropical flora can be characterized as West Indian, its origins are largely South and Central American. Most of the remaining species native to Puerto Rico and the Virgin Islands are widely distributed in continental tropical America.

Although some deforestation took place in pre-Columbian times, the natural vegetation of Puerto Rico and the Virgin Islands has been most drastically altered since the arrival of European colonists. By 1912, more than 80 percent of the islands' area had been deforested, and less than 1 percent (approximately 22,000 acres) of their total area remained in pristine condition, nearly all of it in Puerto Rico's Luquillo Mountains. Initially, coastal and lowland forests were cleared for agriculture (principally sugarcane and tobacco), grazing, and timber. The introduction of goats and cattle had a particularly deleterious effect on the vegetation, especially in

the drier areas. The impact of human development was severe in the lowland river valleys, where floodplain forests and wetlands were all but eliminated. However, due to topographic extremes, clearing of upland forests was more selective; thus, the extinction of many endemic plant species was avoided.

The twentieth century has brought increased economic growth and a concomitant increase in population density, most notably on Puerto Rico. By 1981, the population of this single island had risen to 3.2 million—nearly 1,000 individuals per square mile. The shift from an agrarian to an industrial economy resulted in emigration from rural to urban areas, with abandonment and natural reforestation of agricultural lands. This shift, however, together with the increased pressure of a steadily growing population, is placing a higher premium on land use for housing, highways, communications facilities, and solid waste disposal, thus renewing demands on lands now undergoing vegetative recovery.

In many ways, current land use practices are exerting a more profound influence on the flora than those of the past. In the Virgin Islands, the effects of agriculture and grazing are being replaced by the impacts of resort and residential development. Although there has been an increased awareness of the need to conserve forest cover, at present only 4 percent (88,000 acres) of the land area of Puerto Rico is protected by National or

Commonwealth Forest status. Many of the plant species that are recognized as requiring protection occur largely or exclusively on private lands.

During the past 15 years, implementation of the Endangered Species Act and resulting investigations into the status of rare plant species have revealed the degree to which the native flora of Puerto Rico and the Virgin Islands is threatened. More than half of the 234 endemic species may be in trouble, and some are on the verge of extinction. Between 1980 and 1983, 109 species received Federal recognition when they were placed on the list of candidates under review for formal listing; however, it was not until April 1985 that the first plant species from the region was placed on the U.S. List of Endangered and Threatened Wildlife and Plants.

Listed as Endangered, the beautiful goetzea (*Goetzea elegans*) is a small evergreen tree in the nightshade family (Solanaceae) that was once believed extinct. The species was rediscovered in the moist coastal forests of northern Puerto Rico, and is now known to number 50 individuals, all on private lands. In August 1985, Vahl's boxwood (*Buxus vahlilii*), a member of the boxwood family (Buxaceae), became the second Puerto Rico plant officially listed as Endangered. Fewer than 60 individuals of *B. vahlilii* remain. They grow on private lands in forest types similar to those inhabited by *Goetzea elegans*.

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Montane forests of the Luquillo Mountains (within the Caribbean National Forest) are refugia for many threatened and endangered plants.

photo by Bernice DeSantos

Caribbean Plants

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A third tree, the prickly ash (*Zanthoxylum thomsonianum*), was listed as Endangered on December 20, 1985. The species is nearly extinct in Puerto Rico, but approximately 300 plants were known to exist at one site on St. Thomas, U.S. Virgin Islands. However, during the final days before the species was listed, half of the remaining St. Thomas plants were destroyed during clearing for construction of vacation homes. The Caribbean Field Office was informed of the problem by concerned citizens, and it is now negotiating to protect or salvage the remaining plants.

In addition to the above species, other listing proposals have been prepared. One of these is for *Banara vanderbiltii*, another small evergreen tree of the moist coastal forests of northern Puerto Rico, where a single population of six individuals grows on private land. Close to San Juan and surrounded by urbanization, this population may be extirpated at any time. Another 94 species are candidates for listing, and many number fewer than 100 plants. More than 20 additional species are now known to be equally as rare and will be added to the next revised notice of plant candidates for listing. Most of these are endemic to Puerto Rico, and many occur only in the moist lowland forests

of the north coast, an area experiencing the greatest industrial and residential growth.

There is considerable catching up to do. The FWS is being alerted to the plight of individual plant species faster than those already under consideration can be formally surveyed and listed. Not only is there a backlog of candidate species needing protection, but there is also a need to establish an overall strategy for their recovery.

The FWS Caribbean Field Office is coordinating with the Center for Plant Conservation (a nationwide organization recently formed to coordinate the collection and cultivation of endangered plants) and regional botanical gardens for the collection and transfer of plant material from surviving populations of species considered to be in jeopardy. This material will then be maintained as insurance against loss and to provide material for research, education, and reintroduction.

What is the outlook for the future? Can Puerto Rico, with its extremely high population density and overwhelming social needs, respond effectively to the conservation needs of plants and their habitats? From the perspective of the FWS and other resource agencies, this region represents the only area of the New World tropics where strong legislation enacted to protect species and their habitats is available. The lessons learned through this process may prove valuable in other tropical regions where the same questions must be answered.



photo by Robert Pace

Condominiums, hotels, and vacation homes compete for limited space in the U.S. Virgin Islands to the exclusion of natural vegetation.

Approved Recovery Plans

The following species are among those for whom recovery plans have been approved in recent months. Copies of recovery plans are available for purchase approximately 6 months after the date of their approval from the Fish and Wildlife Reference Service, 6011 Executive Boulevard, Rockville, Maryland 20852; telephone toll-free at 800/582-3421.

Santa Barbara Island Liveforever

The Santa Barbara Island liveforever (*Dudleya traskiae*) is a small perennial herb in the stonecrop family (Crassulaceae). Its succulent leaves, which grow 1.5 to 6.0 inches (4 to 15 centimeters) in length, form basal rosettes. A typical plant has 8 to 12 rosettes, each consisting of 25 to 30 leaves. Inflorescences 8 to 12 inches (20 to 30 cm) high arise from the rosettes and the yellow flowers, which are frequently tinged with red, generally open in April and May.

D. traskiae was listed as Endangered in 1978. This species is endemic to Santa Barbara Island, one of the smallest of the Channel Islands located off southern California. The island, managed by the National Park Service (NPS) as part of Channel Islands National Park, is only 652 acres (264 hectares) in size and is bounded by rugged cliffs. The liveforever grows in shallow, rocky soils within several canyons on the eastern side of the island, on the southern cliffs, and on the steep slopes of Signal Hill at the southwestern edge of the island. During 1982-1984 surveys by NPS personnel, only 10 colonies of *D. traskiae* could be found. Historically, the species probably occupied much more of the island than it does today.

The 1984 NPS survey located only 229 mature individual plants, and the number observed to flower decreased from 95 in 1983 to 58 in 1984. Most of the plants were found on Signal Hill.

Direct and indirect impacts of human activity on the small island have damaged the natural vegetation, including *D. traskiae*. By 1849, Santa Barbara Island was densely populated with feral goats (*Capra hircus*) that settlers had earlier introduced. Trampling and intensive grazing by these animals may have seriously reduced liveforever numbers and distribution before the goats were eliminated from Santa Barbara Island around 1915. Another exotic herbivore, the "New Zealand Red" strain of the

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Approved Plans

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domestic rabbit (*Oryctolagus cuniculus*), was introduced on the island in 1942, and its numbers increased to an estimated peak of 2,621 animals in 1955. Biologists from the Santa Barbara Museum of Natural History have observed both rabbits and the island's endemic deer mice (*Peromyscus maniculatus elusus*) feeding on the liveforever. An NPS control program, which began in 1954, resulted in the elimination of rabbits from Santa Barbara Island by August 1981.

Although eradicating exotic goats and rabbits was essential to the recovery of *D. traskiae*, it did not in itself recover the species. There have been problems in recent years with poor seedling establishment, due to climatic or unknown factors. The 1984 NPS survey of Santa Barbara Island tallied only 673 liveforevers, including seedlings.

Exotic vegetation, particularly aggressive weedy species, has greatly influenced the vegetation of Santa Barbara Island, and may have contributed to the decline of *D. traskiae*. One of the best known of the invading species is the iceplant (*Gesoul* (= *Mesembryanthemum crystallinum*), which was said to have covered more than half of the island before being burned back by a large fire in 1959. (The same fire probably caused the extinction of the endemic Santa Barbara Island song sparrow, *Melospiza melodia graminea*.) Currently, iceplant is again scattered over much of the island and this weed covers the summit of Signal Peak.

The NPS has already taken a number of steps to conserve habitat on Santa Barbara Island. In addition to eliminating the rabbits, it has removed all vehicles from the island, kept visitors away from sensitive areas, and developed plans for the management of natural and cultural resources within the Channel Islands National Park. The NPS also has proposed a long-term research program that would map and monitor each liveforever site.

Recovery Actions

The Santa Barbara Island Liveforever Recovery Plan was approved June 27, 1985. Its ultimate objective is to ensure recovery by securing all colonies in a vigorous, self-sustaining condition and reestablishing the species in 95 percent of its apparently suitable habitat. As an interim step, consideration could be given to reclassifying *D. traskiae* from Endangered to Threatened when all known colonies are protected and self-sustaining, and when the species occupies 50 percent of the suitable habitat. Criteria for identifying "suitable habitat" will be determined following further research.

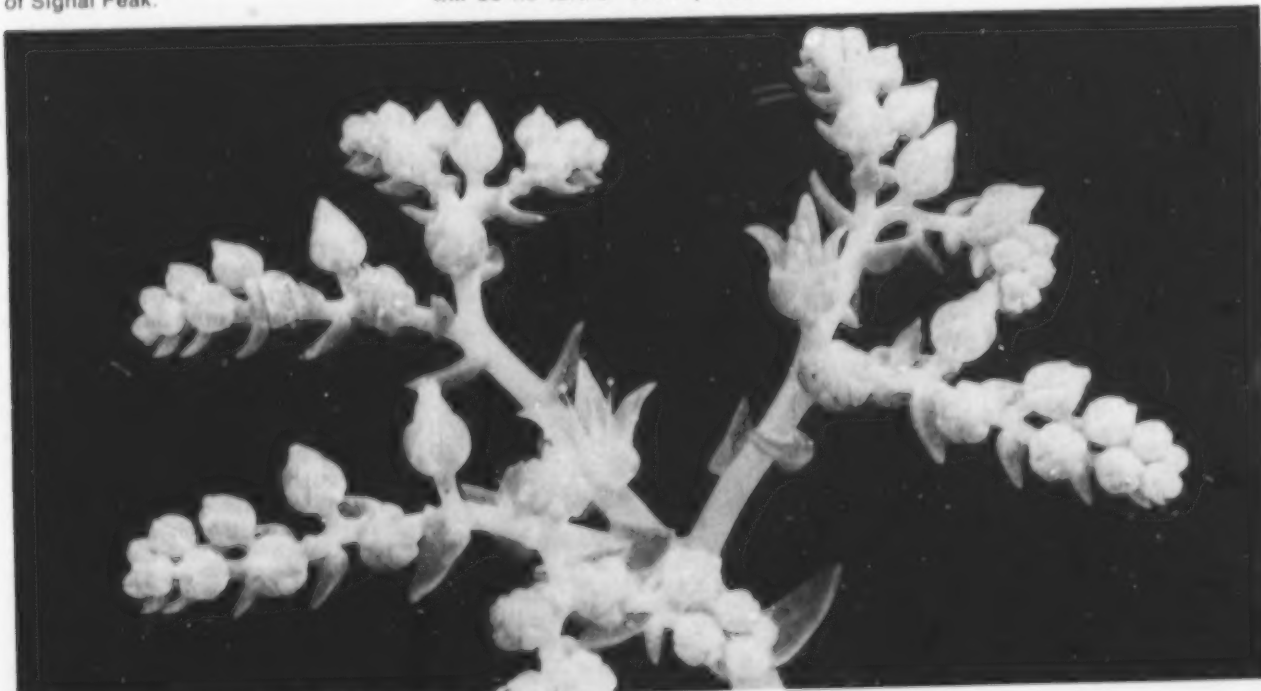
Under the Endangered Species Act, the Santa Barbara Island liveforever and its habitat receive protection from take, trade, and adverse effects of Federal activities. Further, the NPS *Natural and Cultural Resources Management Program and General Plan* states that there will be no further development of the

island. The NPS will continue to protect sensitive areas of the island from visitor use.

A program of reintroducing *D. traskiae* into historical habitat is recommended in the recovery plan as a means of establishing viable population levels and/or new colonies. Seeds would be gathered from selected wild plants on the island during late summer and cultivated by horticulturists knowledgeable of *Dudleya* and other members of the stonecrop family. Care should be taken to collect the fewest seeds necessary from any given area and only what seed is needed for the annual production of 100 to 500 seedlings. Before any reintroduction can occur, however, more research must be conducted on the species' ecology and reproductive biology.

The NPS has proposed a 3-year feasibility project to eradicate the non-native iceplant and annual grasses. Although it will not directly affect the liveforever, a successful project could eventually permit reestablishment of the species on "reclaimed" areas. Action also will be taken against exotic herbivores like murid rodents and garden snails, if it is believed necessary for *D. traskiae* survival.

The recovery plan recommends a long-term monitoring effort to detect demographic trends and to warn of potential threats to the species or its habitat. If this and other recovery actions specified in the plan are successful, the Santa Barbara Island live-



Santa Barbara Island liveforever inflorescence

photo by Reed Moran

Approved Plans

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forever indeed may gain a chance to live forever.

MacFarlane's Four-o'clock

The MacFarlane's four-o'clock (*Mirabilis macfarlanei*) was named for Ed MacFarlane, a boatsman who discovered the plant along the Snake River in Oregon in 1936. This member of the Nyctaginaceae or four-o'clock family is a perennial with a stout, deep-seated taproot, somewhat succulent leaves, and large (up to 25 mm long and 25 mm wide), rose-purple flowers. Species belonging to this family are named after one of the commonly cultivated members whose flowers open up in the afternoon.

Two populations colonies of *M. macfarlanei*, comprising seven colonies, currently exist. They are spread over approximately 60 acres in northeast Oregon and west-central Idaho on both public and private lands. The plants are scattered on open, steep slopes of sandy soils.

Mirabilis taxa in the U.S. are mainly restricted to the Southwest, so it is quite unusual for *M. macfarlanei* to exist as far north as Idaho and Oregon. It is assumed that the genus expanded northward during a period of warmer climate; when temperatures cooled, the species was, in essence, trapped. The Salmon and Snake River canyonland area in northeastern Oregon and west-central Idaho provides some of the longest growing seasons and mildest winter conditions of any mountainous region east of the Cascades. If *M. macfarlanei*

originated in the north during a warmer period and its path of retreat was cut off by cooling climate and less favorable conditions, the warmer canyon climate would explain the species' restricted distribution.

On October 26, 1979, the FWS listed MacFarlane's four-o'clock as Endangered because of the many threats to its survival. The Oregon population along the Snake River shares its canyon bottom habitat with a hiking trail, and use of this river trail has increased since the area was designated a National Recreation Area. Trampling as well as plant collection at the site poses problems for *M. macfarlanei*. Collecting of these rather attractive plants could easily cause extirpation if the population sites become widely known.

At the time the species was listed, the effects of grazing on its survival were not known, but recent evidence suggests that grazing may have an effect on the recovery of *M. macfarlanei*. The mere presence of livestock trampling, which causes soil erosion, appears to be a potential hazard. In addition, at least two species of fungi have been observed on the vegetative parts of some plants located above the Snake River. However, the overall effects of fungal diseases on this species are not yet known.

Recovery Actions

The prime objective of the *MacFarlane's Four-o'clock Recovery Plan* (approved by the FWS on March 27, 1985) is to protect and manage a total of 10 *M. macfarlanei* colonies, at least five in each population. The first step in this recovery effort is to identify a sufficient number of colonies that includes a wide spectrum of the species' current genetic variability. Potential habitats should also be identified and surveys con-

ducted to determine if any additional colonies exist.

Once the colonies have been identified, at least 10 sites must be secured by long-term administrative agreements with the landowners on whose land *M. macfarlanei* is found. Landowners of all sites will be apprised of the nature of the FWS recovery effort for this plant, and their willingness to participate in agreements for the species' protection will be determined. General habitat management and rehabilitation needs will also be discussed with the landowners.

After the colonies and habitats have been located and secured, proper management of the *M. macfarlanei* colonies must follow if recovery objectives are to be achieved. Habitat Management Plans developed and implemented for each colony will aid in this important endeavor. Further study of the species to determine colony status and trends, including distribution of the species, response to environmental demands, adaptation, and speciation, will also aid significantly in learning about the optimal habitat conditions for its survival and, ultimately, aid in its recovery. Other studies to determine the effectiveness of management activities and to determine factors such as competition with associated species, abiotic requirements, and impacts of various threats to the plant will prove beneficial in developing more accurate management techniques.

If, by chance, enough colonies in each population are not located and secured, it will be necessary to establish sufficient colonies in similar habitats within the species' historical range to satisfy the recovery objectives. It is estimated that no more than three colonies would be required, in addition to the seven extant colonies identified for protection in the objective. Selected sites must possess as nearly as possible the same habitat characteristics as the extant colonies and preferably be located on public lands.

Another significant step in the recovery of *M. macfarlanei* is to develop criteria for production of quality propagated plants. The first part of this recovery task is to reduce the loss of colonies and genetic variability resulting from habitat loss and alteration, illegal take, or other stresses as they become evident. Next is selecting a grower that has the knowledge, capability, and proven record required to produce seedlings. The grower could establish a reservoir of propagules for each existing colony to be used in new colony reestablishment in the event of local extirpations. Most importantly, propagating and transplanting *M. macfarlanei* should be done in a manner that will maintain the genetic integrity of existing populations.

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photo by Bob Parenti

MacFarlane's four-o'clock (*Mirabilis macfarlanei*) habitat along the Snake River, Oregon.

Approved Plans

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Salt Marsh Bird's-Beak

The salt marsh bird's-beak (*Cordylanthus maritimus* ssp. *maritimus*) is listed by the FWS and the state of California as Endangered. This plant is limited to remnants of coastal saltwater marshes scattered from northern Baja California, Mexico, to Santa Barbara County, California. It has declined from a wider historical distribution, and the limited remaining habitat is vulnerable to development and modification.

The bird's-beak is an unusual component of its salt marsh ecosystem in that it is an annual and hemiparasitic, deriving water and perhaps nutrients from root connections with other plants. The appearance of individual plants can vary considerably. The leaves and stems typically exhibit an abundance of purple pigment, although some individuals are predominantly light-green. Flowering also is variable. The salt marsh bird's-beak can bloom from April to December. In its northern range, the flowers have conspicuous purple lower lips, while to the south they have pale cream-colored flowers with faint purple lines. However, flower color often varies within a single marsh.

All known colonies are located in or near salt marshes, primarily in the upper marsh elevations that are inundated by the highest tides on a periodic basis but above lower areas that receive daily salt water flooding. Marshes, particularly the upper, drier areas that are easier to drain and fill, are vulnerable to damage or destruction from many human activities, including (but not limited to): dumping of dredge spoil, rip-rap, and garbage; draining for agricultural or industrial uses; burning; off-road vehicle (ORV) use; creation of levees, berms, and roads; intentional flooding for various purposes; and dredging for marina developments.

Salt marsh habitat was never extensive in southern California, and all of the sizable marshes between Morro Bay, California, and Ensenada, Mexico (about 75 miles south of the border), have been modified. Ten of them have been drastically altered and three others were completely destroyed. The remaining marshes have been modified to varying degrees, and support only remnants of the former vegetation.

Since 1975, *C. m. ssp. maritimus* has been verified as extant in six of the estuaries from which it previously had been reported, in addition to a new site at Ormond Beach near Point Mugu. (A map is available in the recovery plan.) Its survival at other historical localities is thought unlikely in light of the heavy habitat modification, although further

surveys are recommended. Two Endangered birds can be found in the marshes where the bird's-beak still grows, the California least tern (*Sterna antillarum browni*) and the light-footed clapper rail (*Rallus longirostris levipes*).

Recovery Actions

The Salt Marsh Bird's-Beak Recovery Plan, approved December 6, 1985, outlines the steps thought necessary to restore *C. m. ssp. maritimus* to a secure, self-sustaining status. Reclassification from Endangered to Threatened can be considered when the plant has been maintained in sufficient numbers (yet to be determined) at 12 or more major sites within its historical range. More information will be needed before the standards for recognizing full recovery can be established.

The plan recognizes that recovery can only be achieved by maintaining and restoring coastal salt water marsh ecosystems upon which the plant depends. Protection of existing bird's-beak colonies and potential habitat in the Tijuana River estuary of southern California is a high priority. Federal holdings in the area include the Tijuana Slough National Wildlife Refuge, and management of this refuge could be used as a model for marsh habitat management at other sites for the benefit of the bird's-beak and other Endangered species.

The recovery plan recommends controls on visitor use and ORVs in sensitive marsh areas, along with on-site personnel to enforce such measures. Certain habitat management activities may be needed in order to maintain the critical balance of salt water and fresh water entering the ecosystem, to prevent excessive or unusual flooding resulting from high upland runoff, and to prevent other potentially harmful changes in marsh hydrology.

U.S. Navy property at Point Mugu and the Tijuana River estuary historically supported large, vigorous colonies of the bird's-beak. There is a possibility also that other military lands, such as the Santa Margarita River estuary on Camp Pendleton, may still contain colonies or at least suitable habitat for recovery. Increased cooperation between the Navy and the FWS in management of these areas through Memoranda of Understanding is called for in the recovery plan.

Because the bird's-beak and potential habitat also exist on some State, municipal, and private lands, the plan calls for seeking cooperative management agreements for these sites as well. Two colonies still exist in upper Baja California, Mexico, and the FWS will offer assistance to Mexican conservation officials.

The feasibility of maintaining an emergency supply of seed from each site should be investigated. It may later be possible to create a secondary source of seeds by cultivating plants from wild-collected seeds. If a colony later were to suffer catastrophic seed loss, the site could be reseeded the next growing season. The FWS is investigating the possible use of seeds to reestablish extirpated colonies where suitable habitat remains.

The recovery plan recommends additional studies on the biology of *C. m. maritimus* and on coastal salt marsh ecosystems. Information gathered during such research is needed in order to better manage the habitat, to select potential reintroduction sites, and to determine population level goals for recovery. Field studies are continuing in an effort to detect any new colonies or to rediscover stands thought to be extirpated. Finally, periodic monitoring will be needed to evaluate the plant's status and to gauge the success of the recovery effort.

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The Office of Sea Otter Coordination prepared and distributed a revised preliminary draft Environmental Impact Statement and translocation plan for the proposed translocation of southern sea otters (*Enhydra lutris nereis*).

Efforts by the SESO reached fruition for mitigating the loss of habitat for the Threatened valley elderberry longhorn beetle (*Desmocerus californicus dimorphus*), which feeds on elderberry plants. The loss occurred during removal of riparian vegetation for the American River Flood Control Project. The California Department of Water Resources has agreed to begin a program of elder-

berry replanting to mitigate the loss of 29 elderberry bushes that were accidentally damaged or destroyed during maintenance work for the flood control project. An agreement to prevent future disturbance of the beetle's habitat during work on the project will be prepared.

Responding to efforts by the SESO, Laguna Niguel Field Office, and California Department of Fish and Game (CDFG), the Bureau of Reclamation (BR) recently concluded negotiations for the purchase of three key sections of privately held land in San Sebastian Marsh, Imperial County, California. The acquired lands include over three linear miles of proposed Critical Habitat for the desert pupfish (*Cyprinodon macularius*) along the San Felipe Creek. The lands

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were acquired to satisfy BR's mitigation obligations relative to a project it completed in another part of the Imperial Valley in the early 1980's. The area will be turned over to CDFG after a habitat management plan has been prepared.

The SESO reported that progress has been made regarding the use of Famphur R, an insecticide that is poured onto the backs of cattle for warble and lice control. The chemical is highly toxic to bald eagles, red-tailed hawks, black-billed magpies, and other bird species. Based on wildlife concerns, the California Cooperative Extension Office will advise users of the compound of tech-

niques to minimize exposure to wildlife and will implement a monitoring program to try to quantify the magnitude of the problem.

Region 2—The whooping crane (*Grus americana*) injured near Los Lunas, New Mexico, in early January has continued to improve. By late February, it flew well in short flights; however, it had not begun migration as of February 28.

Only two whooping cranes remained in New Mexico by the end of February; the others had migrated into Colorado. Thirty-one whooping cranes were identified during the over-wintering period, and several others may have been present because at least five birds lack the color markers placed on the birds for identification.

Region 2's Office of Endangered Species and Division of Refuge Management are involved in a cooperative effort to hold Endangered Colorado River fish species in selected refuges located along the lower Colorado River. Use of refuge aquatic habitats will permit the rearing of these fish to subadult size, thus maximizing their chances of survival when reintroduced into historical stream habitats. The first such refuge stocking consisted of approximately 300 Endangered bonytail chubs (*Gila elegans*) transplanted to a pond at Imperial National Wildlife Refuge in Arizona. As fry and fingerlings become available from Dexter National Fish Hatchery

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Current Status of the Chapman Rhododendron

Jacksonville, Florida, Endangered Species Field Station

The Jacksonville Endangered Species Field Station recently received a report entitled "Population Survey, Monitoring Program and Commercial Availability of *Rhododendron chapmanni*." Under an Endangered Species Act Cooperative Agreement, the Fish and Wildlife Service contracted with the Florida Game and Fresh Water Fish Commission, with the concurrence of the Florida Department of Agriculture and Consumer Services, for a survey of the current status of this Endangered plant. The Commission, in turn, contracted with the Florida Natural Areas Inventory, part of The Nature Conservancy, for the survey work.

The Chapman rhododendron is a small (0.5-2 meters tall), evergreen shrub of the heath family (Ericaceae). It has light pink flowers and blooms during March and April. The shrub is found on pinelands in three disjunct populations, two in the Florida panhandle and one in northeast Florida. Almost all of the habitat where the Chapman rhododendron is found is owned by the St. Joe Paper Company, which is voluntarily protecting some of the sites. The Nature Conservancy is also working to preserve additional locations.

The table below shows the current population status. Fluctuations in population numbers between 1979-1984 are due mostly to more intensive surveys.

The 1985 survey revealed a population decrease, due primarily to habitat destruction in Gulf County, where the population may have been reduced by almost one-half. Populations were reduced by intensive silvicultural practices, which can include bedding the soil, machine chopping, and the use of herbi-



Chapman rhododendron (*Rhododendron chapmanni*)

cides and fertilizers. At the Gulf County population site, the area has been clear cut, site prepared, and, in some cases, planted with slash pine (*Pinus elliottii*)

where longleaf pine (*P. palustris*) originally grew. Chapman rhododendron recovery in this area has been sparse to nonexistent.

Populations of the Chapman Rhododendron

Population Location	Number of Clumps*			
	1979**	1983***	1984	1985
Liberty and Gadsden Counties (near Hosford)	500	2500	2320	2320
Gulf County	500	500	1130	610
Clay County	50	20	32	32
TOTAL	1050	3020	3482	2962

*A clump is considered here as a cluster of stems rising from the ground.

**Estimates at time of listing.

***Estimates at time of recovery plan preparation.

Visiting Peregrine Demonstrates Restoration Success

by Judy Jacobs and Glenn Kinser
Annapolis, Maryland, Office of Ecological
Services and Endangered Species

Last summer, the Annapolis office staff received a dramatic demonstration that the peregrine falcon (*Falco peregrinus*) reintroduction program is working. On July 30, shortly after 5:00 p.m., an office employee spotted an immature peregrine falcon in a parking lot near one of the buildings in this industrial park area. The falcon held in its talons a large, apparently recently killed pigeon.

After flying briefly about the area, the peregrine carried its prey across the street to our own office's parking lot, where it settled down for a leisurely meal. The peregrine seemed quite accustomed to people, apparently unruffled by the human spectators a mere 15 feet away who clicked cameras and videotaped the entire event. Some 45 minutes later, the sated peregrine stretched its wings and flew off to the northeast, leaving behind a mostly consumed pigeon carcass and a group of amazed people.

By tracing the peregrine's band numbers, we learned that it had hatched about 30 miles to the north at the U.S. Fidelity and Guaranty Building in Baltimore. This seemingly unlikely nest site has hosted peregrine families since 1978, when Scarlett, a peregrine that had been released in coastal Maryland the previous year, chose to nest on a ledge of the building's 33rd floor. In the years that followed, a number of male peregrines were introduced to her, but she did not mate successfully with them. She proved to have fine maternal instincts, however, for she readily accepted and raised captive-born peregrine chicks that were substituted for her own infertile eggs. Between 1979 and 1983, Scarlett successfully raised 18 foster chicks. Finally, in 1984, Scarlett bred successfully with a wild male peregrine (dubbed Beauregard) and together the pair raised four young.

Scarlett died in September 1984, apparently from complications arising from a throat infection. Within four days, however, Beauregard had paired with a new female, Blythe, who had been released the previous spring from a site in coastal New Jersey. Together, these birds fledged four of their own young, including the peregrine who entertained us this July.

Prior to the 1940's, some 350 pairs of peregrines nested in North America east of the Mississippi River. In the late 1940's, however, they began to rapidly disappear. Growing concern over this dramatic decline led biologists in 1964 to survey all of the known peregrine eyries (nest sites) in the eastern United



This peregrine falcon was sighted feasting on a pigeon at the parking lot of the FWS Annapolis office. In 1985, the count of young peregrines fledging in the eastern U.S. increased by more than 50 percent over the 1984 total.

States. To their dismay, not a single nesting peregrine was found. The culprit was found to be DDE, a principal metabolite of the persistent pesticide DDT. DDE contamination caused the birds to produce thin-shelled eggs that were easily crushed during incubation. The use of DDT was later banned by the Environmental Protection Agency in 1972.

In 1975, the Peregrine Fund at Cornell University began to reintroduce captive-reared peregrines to the wild by a process known as "hacking." This involves placing chicks in a suitable nest site (usually a tall tower, an existing building, or a cliff) and providing them with food until they have fledged and are on their own. When birds reared by this method become mature, they often return to their hacking area to nest. Scarlett, the matriarch of the Baltimore eyrie, was hacked in 1977 on the Maryland coast within 20 miles of her selected urban nest site.

Cornell's hacking program, which has received financial support from the FWS,

the U.S. Forest Service, and numerous State and private sources, has been tremendously successful in recent years. In the mid-Atlantic region, peregrines have been successfully hacked from seven sites in Maryland, five sites in Virginia, and even a site in Washington, D.C. When a pair of peregrines began showing interest in nesting on the Chesapeake Bay Bridge in 1983, the Maryland Wildlife Administration installed a nest box beneath the bridge. This year, three young were fledged from the Bay Bridge nest.

As shown in the table below, the number of wild pairs established in the East has increased steadily since 1980, when the first successful nesting of reestablished peregrines was observed. The Peregrine Fund predicts that, if its current rate of increase is sustained, the peregrine population in the eastern U.S. will reach pre-DDT levels around 1990—a true success story in the history of endangered species restoration.

Nesting Success of Free-living Peregrine Falcons in the Eastern U.S.

Year	Pairs	Pairs Laying Eggs	Young Fledged
1979	3	2	—
1980	3	2	4
1981	7	4	10
1982	10	6	12
1983	17	8	23
1984	27	12	30
1985	38-40	25	46

Editor's Note: In late 1985, most of Cornell's breeding peregrines were moved to The Peregrine Fund's World Center for Birds of Prey (5666 West Flying Hawk Lane, Boise, Idaho 83709).

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(NFH), they will be stocked into closed aquatic habitats on Havasu, Imperial, and Cibola National Wildlife Refuges.

During February 6-8, biologists from the Dexter NFH, Arizona State University, Arizona Game and Fish Department, Nevada Department of Wildlife, and Utah Division of Wildlife Resources collected 589 Endangered woundfin (*Plagopterus argentissimus*) from the Virgin River in Utah and Arizona. The group had hoped to collect up to 6,000 woundfin for reintroduction as experimental populations in the Hassayampa River and Tonto Creek in central Arizona. Because of the small number of fish taken, all were moved to Dexter NFH in New Mexico.

Spawning this spring should supply sufficient numbers of woundfin for late summer stocking into the wild. The low numbers of woundfin found in the Virgin River is surprising since past surveys have given indications of a much larger population. Population monitoring of woundfin has been occurring since 1977. The Woundfin Recovery Team will check this population again within the next 2 months.

FWS representatives from the Office of Endangered Species and Division of Realty met with U.S. Forest Service, National Park Service, Texas Parks and Wildlife Department, Texas General Land Office, and Texas Nature Conservancy representatives in late February to discuss species protection goals and potential acquisition sites as they relate to recovery efforts.

At a recent meeting of the Texas Plant Recovery Team, recovery efforts for listed plants were reviewed and changes or additions were made to the candidate list of Texas plants. Priorities were set regarding status survey proposals and future plant listings. In particular, the need for better definition of habitat requirements was discussed, as well as the need to locate additional populations of several species.

Region 3—On January 24-25, John Sidle of the Region 3 staff attended the Endangered Species Prairie Provinces Workshop Program in Edmonton, Alberta, Canada. The meeting, organized by the Federation of Alberta Naturalists, included a session on the piping plover (*Charadrius melodus*). The piping plover was recently added to the U.S. List of Endangered and Threatened Wildlife and is also listed as endangered by Canada's Committee on the Status of Endangered Wildlife.

Because the plover is a migratory bird, the Canadian Wildlife Service (CWS)

wants to cooperate with the FWS in the species' conservation. The CWS has begun drafting a management plan to be coordinated with FWS' recovery plans, which are currently being developed for the piping plover populations on the Atlantic coast and Great Lakes/Northern Great Plains.

Endangered Species Act-Section 6 cooperative agreements have been signed between the FWS and the Iowa Conservation Commission for the conservation of plants, and with the Indiana Department of Natural Resources for wildlife conservation. These States are now eligible to apply for grant funds as authorized by the Act.

A meeting of the Kirtland's Warbler Recovery Team was held in Lansing, Michigan, on February 18 and 19. Among the topics discussed were the management of the species' habitat at Camp Grayling and an FWS research proposal to color-mark (via plastic leg bands) as many as 160 Kirtland's warblers (*Dendroica kirtlandii*) annually following their fledging period.

A lone male Kirtland's warbler was sighted last June through July among the jack pines in southern Ontario. This is only the third Canadian location—the second in Ontario—where this songbird has been sighted. To protect the bird, the site has been disclosed only to officials of the Ontario Department of Natural Resources.

Region 4—A public hearing on the proposal to list the flattened musk turtle (*Sternotherus depressus*) as a Threatened species was requested by the Alabama Coal Association and was held in Birmingham, Alabama, on February 6, 1986. Just prior to the public hearing, the final report on a study of the turtle, conducted by Dr. C. Kenneth Dodd, Jr., of the FWS' Denver Wildlife Research Center station in Gainesville, Florida, and sponsored by the Office of Surface Mining, was received. The comment period was extended until March 18, 1986, to allow for review and comment on the new information, which was not available at the time of the listing proposal.

Only two specimens of the Endangered Culebra giant anole (*Anolis roosevelti*) have ever been collected. One of these provided the first description of the species in 1931, while the second was collected in 1932 and became the last specimen to be seen by biologists. The species was listed as Endangered in 1977, although some experts believed it was already extinct. Over the past few years, several short-term searches have taken place on Culebra Island without success; however, incidental reports by local residents

suggest that the giant anole may have been seen as recently as 1978.

In an effort to confirm the species' existence, the Commonwealth of Puerto Rico, aided by Endangered Species Act-Section 6 funding, plans to conduct a search for the anole in remaining potential habitat, the majority of which lies within the Culebra National Wildlife Refuge. Public assistance will be enlisted through local radio programs, and meetings between researchers and local science teachers and their students. Over a 6-month period, the search will include general ground surveys, day and night transect surveys, periodic intensive observations from elevated blinds in sites which appear to be optimal giant anole habitat, and gathering information from local residents.

The FWS recently received a status survey report on *Amphianthus pusillus*, a Category 2 listing candidate, in South Carolina. The survey for this plant was conducted by Doug Rayner, botanist with the South Carolina Heritage Program, and involved an extensive search of 65 granite outcrops throughout the State. Only three outcrops were found to have an *A. pusillus* population. All populations have been impacted by off-road vehicles and heavy recreational use. This plant also occurs in Georgia and Alabama. A status review is currently being conducted by the Jackson, Mississippi, Endangered Species Field Office to determine if a proposed listing is justified.

The Jacksonville, Florida, Endangered Species Field Station received a final status survey report and taxonomic evaluation on five small Florida mammals. The work was done by the Florida State Museum staff through the Florida Cooperative Fish and Wildlife Research Unit. The five mammals surveyed were the Sherman's short-tailed shrew (*Blarina carolinensis shermani*), the Homosassa shrew (*Sorex longirostris eionis*), the Pine Island rice rat (*Oryzomys palustris planirostris*), the Sanibel Island rice rat (*O. p. sanibeli*), and the Chadwick cotton mouse (*Peromyscus gossypinus restrictus*). All are Category 2 listing candidates and occur only in Florida.

The Homosassa shrew was found to still occur at the type locality at Homosassa Springs in Citrus County, where it inhabits hydric hammock forest. The shrew was not found in similar habitat at the nearby Crystal River. Considerable loss of hydric hammock has occurred in Citrus County, although a substantial amount remains around the type locality.

Sherman's short-tailed shrew was not found at the type locality near Fort Myers in Lee County. The most recent record for this shrew is from two speci-

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mens collected in 1981, so it is believed that the subspecies still exists, even if extirpated at the type locality by habitat conversion.

The Pine Island and Sanibel Island rice rats were both found to be abundant in suitable habitat. It appears that these two taxa may actually be the same subspecies but distinct from the mainland subspecies (*O. p. coloratus*). These island rice rat populations face increasing threats from the invasion of their wetland habitat by woody plants.

Despite intensive trapping efforts, the Chadwick cotton mouse could not be located in its previously known range on Manasota Key in Sarasota and Charlotte Counties. The subspecies appears to be extinct, probably due to habitat destruction and predation by house cats on this heavily settled key.

The February Regional Brief item on the 1985 Lower Mississippi River Valley Interior Least Tern Survey should have indicated that the survey included the Mississippi River from Baton Rouge, Louisiana, to the Kentucky/Tennessee State line (not the Missouri/Arkansas State line). Twenty-two colonies of the Endangered interior population of the least tern (*Sterna antillarum*) were confirmed or suspected on the Mississippi River from the Kentucky/Tennessee State line downstream to the confluence of the Arkansas River and the Mississippi. Over this same stretch of river, 1,213 adult interior least terns were observed on three surveys (June 17-18 = 9 terns, June 20-22 = 422 terns, July 18-19 = 782 terns). Further south along the Mississippi, 60 interior least terns were observed but no colonies were located. Four interior least tern colonies (approximately 80 adult terns) were observed along the Arkansas River; no terns were observed on the Red River.

Region 5—Three new hibernating colonies of the Endangered Indiana bat (*Myotis sodalis*) were found during this year's winter bat surveys—two in West Virginia and one in New York State. The New York colony is the northernmost hibernating site known for the species.

A colony of approximately 3,000 individuals of another Endangered bat, the Virginia big-eared (*Plecotus townsendii virginianus*), was found at a historical colony site in West Virginia. This is the largest known big-eared bat colony in the East. The cave housing these bats is closed to visitors during the winter when the bats are hibernating.

A coordinated effort to determine causes of a multi-State freshwater mussel die-off in lakes and major river systems has been initiated by Regions 3, 4,

and 5. Several Endangered mussel species could be seriously impacted.

Region 7—In Region 7, the only publication available to State and Federal agencies and the public that describes Alaska's plant listing candidates is a 59-page booklet written by Dr. David F. Murray of the University of Alaska, Fairbanks Museum. This guide, published cooperatively in 1980 by the U.S. Forest Service (USFS) and Bureau of Land Management (BLM), now requires substantial revision in order to account for research and status surveys conducted during the past 6 years. An interagency agreement is being executed among all major Federal land managing agencies in Alaska—USFS, BLM, and National Park Service—to cooperatively fund a revised edition of this important publication. It is hoped that the new booklet will increase awareness and stimulate further research on the candidate plants of Alaska.

Region 8—The Cape Sable seaside sparrow (*Ammodramus maritimus mirabilis*) occupies seasonally flooded interior prairies in extreme southern Florida. Because of developmental pressures and habitat changes in this area, there is a need to identify both existing populations and suitable habitat for these sparrows. As part of the effort to identify suitable habitat, the U.S. Army Corps of Engineers funded a workshop in February 1985 to develop a habitat model for the Cape Sable seaside sparrow. Representatives from the Habitat Evaluation Procedures Group of the FWS Western Energy and Land Use Team and authorities on the sparrow developed a draft Habitat Suitability Index (HSI) model.

Based on the consensus of workshop authorities and on summer field studies conducted by the Florida Cooperative Wildlife Research Unit, a model was developed that has a significant positive correlation between habitat ratings assigned by a sparrow authority and the HSI model output. The HSI model did not show a correlation with sparrow population density data collected during the single season of study. Further efforts will be required to more completely understand the habitat needs of this sparrow, and to determine why the birds are not occupying areas of apparent optimal habitat. In the interim, the HSI model provides a working tool that can be used to identify suitable habitat.

Until recently, Buldir Island, in Alaska's far western Aleutian Islands, was thought to be the only breeding place of the Aleutian Canada goose (*Branta canadensis leucopareia*). Formerly abundant throughout the Aleutians, *B. c. leucopareia* has been the focus of an intensive recovery program since 1974. In 1979, a small population of breeding

birds resembling Aleutian geese was discovered in the Semidi Islands (western Gulf of Alaska), and a third population of Aleutian-like geese was found on Chagulak Island (eastern Aleutians) in 1982. Identification of these recently discovered populations could help reclassify the birds from Endangered to Threatened.

The Alaska Office of Fish and Wildlife Research used mitochondrial DNA sequence analysis to determine genetic relationships among birds from Buldir, Chagulak, the Semidis, and the nearest mainland populations of small Canada geese. Eggs collected from active nests last June were artificially incubated. Hand-reared goslings were transported to California, where Dr. Gerald Shields (University of Alaska-Fairbanks, on sabbatical at the University of California, Berkeley) completed the laboratory analysis.

Results indicate that the three island populations may be regarded as one genetically homogeneous group that is distinguishable from both the cackling goose and the Taverner's goose. The evidence strongly supports the view that Chagulak and Semidi birds are relict populations of a formerly more continuous distribution along the Aleutian arc and the Alaska Peninsula, and should now be considered as valid range extensions of the Aleutian subspecies of the Canada goose.

This research represents the first attempt to use the analysis of mitochondrial DNA to define avian genetic relationships at the subspecies and population levels.

Foreign Mailings

Some of our readers pass along extra copies of the BULLETIN to their colleagues in foreign countries. While this is fine, please note that the BULLETIN self-mailer works only for mailing to an address in the United States. When mailing to another country, the BULLETIN must be enclosed in an envelope or the U.S. Postal Service will not deliver it.

New Publication

Bald Eagle Production in the North Central Region, a consolidation of thirteen years of bald eagle breeding activity data, is available from the Region 3 Endangered Species Office. Requests for copies should be sent to the U.S. Fish and Wildlife Service, Office of Endangered Species, Federal Building—Fort Snelling, Twin Cities, Minnesota 55111.

Final Listings

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3.9 feet (1.2 meters) tall and has a slight dill fragrance. It grows in swamps, shallow pineland ponds, and wet pine savannas on the lowland plain of the mid-Atlantic coast.

Many of the freshwater wetlands once inhabited by the Canby's dropwort have been drained and converted to lowland pastures, pine plantations, and soybean fields. In other areas, road construction and other forms of development have altered groundwater tables, which also damages the habitat. Only 10 populations of the plant are known to remain in the States of Maryland, North Carolina, South Carolina, and Georgia; the species once also may have occurred in Delaware, but apparently is now extirpated in that State.

On March 28, 1985, the FWS proposed listing the Canby's dropwort as an Endangered species (story in BULLETIN Vol. X No. 4.), and the final listing rule was published February 25, 1986.

The only known Federal action that may affect the Canby's dropwort or its habitat is a planned Soil Conservation Service (SCS) channelization project for the upper Chester River watershed. Maryland's only known population of the plant is within the project area. Flexibility in final project design and fulfillment of the provisions in a January 13, 1983, interagency agreement between the FWS and the SCS will assist in developing solutions to potential problems.

Conservation Measures

Both species now receive the full protection authorized by the Endangered Species Act. Among the conservation

BOX SCORE OF LISTINGS/RECOVERY PLANS

Category	ENDANGERED			THREATENED			SPECIES* TOTAL	SPECIES HAVING PLANS
	U.S. Only	U.S. & Foreign	Foreign Only	U.S. Only	U.S. & Foreign	Foreign Only		
Mammals	25	20	234	4	0	22	305	23
Birds	60	15	141	3	2	0	221	54
Reptiles	8	6	60	8	4	13	99	18
Amphibians	5	0	8	3	0	0	16	6
Fishes	37	4	11	20	3	0	75	39
Snails	3	0	1	5	0	0	9	7
Clams	23	0	2	0	0	0	25	20
Crustaceans	3	0	0	1	0	0	4	1
Insects	8	0	0	5	0	0	13	11
Plants	88	5	1	23	3	2	122	44
TOTAL	260	50	458	72	12	37	889	223**

*Separate populations of a species, listed both as Endangered and Threatened, are tallied twice. Species which are thus accounted for are the gray wolf, bald eagle, American alligator, green sea turtle, Olive ridley sea turtle, leopard, and piping plover.

**More than one species may be covered by some plans, and a few species have more than one plan covering different parts of their ranges.

Number of Recovery Plans approved: 188

Number of species currently proposed for listing: 28 animals
30 plants

Number of Species with Critical Habitats determined: 92

Number of Cooperative Agreements signed with States: 45 fish & wildlife
23 plants

February 28, 1986

measures available under the Act are prohibitions on interstate or international trafficking in listed species without Federal permits; the requirement for the FWS to develop and implement recovery plans; and the possibility of Federal aid to State endangered species conservation programs (for those States that have approved Cooperative Agreements with the FWS under Section 6 of the Act).

The take of listed animals, including the northern aplomado falcon, also is prohibited within lands under U.S. jurisdiction, except under Federal permit. For listed plants, the rule is different: it is against the Act to remove for possession listed plants if they are on lands under Federal jurisdiction, unless a Federal permit has been obtained. *Oxypolis canbyi*, however, is not currently known to exist on Federal lands.

March 1986

Vol. XI No. 3

ENDANGERED SPECIES

Technical Bulletin

Department of Interior, U.S. Fish and Wildlife Service
Endangered Species Program, Washington, D.C. 20240

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ENDANGERED SPECIES

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Endangered Species Program, Washington, D.C. 20240

Protection Given to Seven Species

During the month of March, the following four plants and three fishes were added to the U.S. List of Endangered and Threatened Wildlife and Plants:

Achyranthes rotundata

Achyranthes rotundata is a shrub ranging in height from 1.5 to 6.5 feet



photo by Derral Herbst

Like many other Endangered plants, *Achyranthes rotundata* has been extirpated from most of its historical range by habitat destruction and degradation.

(0.46 to 2.0 meters). It is covered with short, silvery hairs and bears small, inconspicuous flowers in a long inflorescence. Endemic to the island of O'ahu in the Hawaiian Islands, *A. rotundata* has been extirpated from most of its historical range because of agricultural, industrial, residential, and recreational development, along with an invasion of exotic shrubs and trees. Only two populations currently exist: one on a military reserve at Ka'ena Point that consists of two individuals, and the other at Barbers Point where approximately 400 plants remain on both Federal and private lands.

When *A. rotundata* was proposed for listing as Endangered on April 22, 1985 (see BULLETIN Vol. X No. 5), the largest sub-population of the species (80 percent of the total population) was located on land owned by the estate of James Campbell, one of two private land-owners upon whose property this species grows. At present, however, only about 9 percent of the plants remain on this property. The entire population of *A. rotundata* decreased from an estimated 2,000 individuals to 400 between the years 1981 and 1985.

On March 26, 1986, the final rule to list *A. rotundata* under the Endangered Species Act (ESA) was published in the *Federal Register*. This ruling not only gives the species Federal protection, but it also invokes listing under Hawaii State law, which prohibits taking and encourages conservation.

Mauna Kea Silversword or 'Ahinahina

The Mauna Kea silversword (*Argyroxiphium sandwicense* ssp. *sandwicense*), historically abundant on the volcano for which it is named, has been reduced to only one known natural population located along the Wailuku River on the island of Hawai'i. It once numbered in the thousands, but today the subspecies consists of about 110 individuals, 95 of which are nursery-raised plants that the Hawaii Department of Land and Natural Resources transplanted into the area of the natural population.

This silversword species produces a globular basal rosette of dagger-shaped



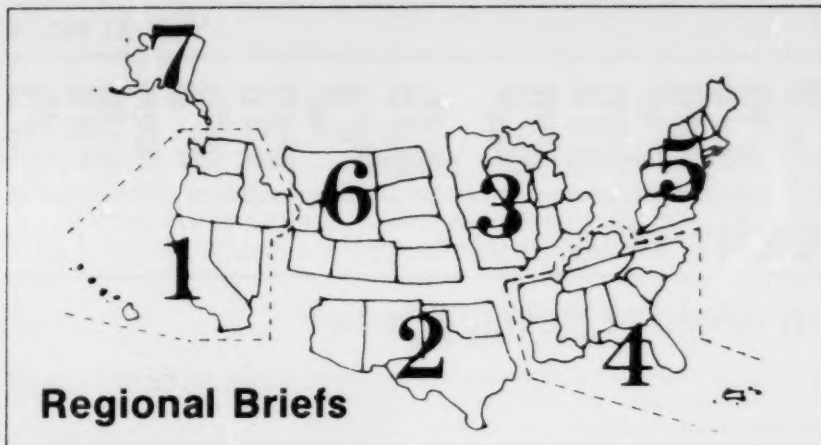
Mauna Kea silversword

photo by Derral Herbst

leaves that grow up to a foot (30.5 cm) long and are cloaked with silvery hairs. The rosettes grow for an average of 5 to 15 years, reaching a diameter of 2 feet or more before producing a narrow flowering stalk that bears heads of pinkish flowers. After flowering, plants with a single rosette die; individual rosettes of multiple-rosette plants also die.

Habitat destruction by feral animals (primarily goats, cattle, sheep, pigs, and horses) have eliminated the Mauna Kea silversword from much of its former range and vastly altered and degraded

(continued on page 4)



Regional Briefs

Endangered Species Program regional staffers have reported the following activities for the month of March:

Region 1 — The FWS Olympia, Washington, Field Office staff, in cooperation with the U.S. Forest Service, has completed its 1986 wintering bald eagle (*Haliaeetus leucocephalus*) surveys. The

Lava Creek roost was used for the second straight year, which confirmed it as a roost site, but there was insufficient time to verify another suspected roost site.

The north Idaho bald eagle study is progressing quite well. Six eagles have been captured for telemetry, and another 16 eagles will be trapped this spring.

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U.S. Fish and Wildlife Service Regions

Region 1: California, Hawaii, Idaho, Nevada, Oregon, Washington, and Pacific Trust Territories. **Region 2:** Arizona, New Mexico, Oklahoma, and Texas. **Region 3:** Illinois, Indiana, Iowa, Michigan, Minnesota, Missouri, Ohio, and Wisconsin. **Region 4:** Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, South Carolina, Tennessee, Puerto Rico, and the Virgin Islands. **Region 5:** Connecticut, Delaware, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, Vermont, Virginia, and West Virginia. **Region 6:** Colorado, Kansas, Montana, Nebraska, North Dakota, South Dakota, Utah, and Wyoming. **Region 7:** Alaska.

The ENDANGERED SPECIES TECHNICAL BULLETIN is published monthly by the U.S. Fish and Wildlife Service, Department of the Interior, Washington, D.C. 20240.

Following a waterfowl disease workshop sponsored by the FWS Wildlife Disease Laboratory (WDL), a liaison was set up between the WDL and The Peregrine Fund to diagnose and control avian diseases in case of an infectious breakout in birds at the Fund's facility in Boise, Idaho.

The FWS Great Basin Complex at Reno, Nevada, assisted the Nevada Heritage Program (under the guidance of The Nature Conservancy) in initiating the FWS/Nevada cooperative program for plants. Nevada will contract out the survey of Ash Meadows' rare plants under the Endangered Species Act (ESA)-Section 6 program.

The FWS Office of Sea Otter Coordination, with assistance from the Pacific Northwest Solicitor's Office, prepared a re-draft of a proposed rule on translocation and containment of southern sea otters (*Enhydra lutris nereis*) within the immediate vicinity of San Nicolas Island, California. This draft describes the status of the species; identifies the details of translocation, research, and containment procedures; identifies translocation and management zones; states the applicability of ESA-Section 7; and sets forth the criteria for determining the success of the translocation. This comprehensive draft will be reviewed internally and by the Interagency Project Review Team before being published.

The FWS Sacramento, California, Endangered Species Office, in cooperation with staff from FWS Region 2 and the California Department of Fish and Game (CDFG), assisted in reintroducing the Endangered bonytail chub (*Gila elegans*) into the lower Colorado River. Approximately 300 bonytail were released into isolated backwaters on the Imperial National Wildlife Refuge (NWR). This recovery task is the first in a series of reintroductions of bonytail and Colorado squawfish (*Ptychocheilus lucius*) that are planned for the lower Colorado River basin. These Endangered fishes will be grown to a relatively large size ("grown-out") by CDFG before being released into the Colorado. This grow-out process is necessary to reduce bonytail and squawfish vulnerability to the many exotic predators now established in the lower Colorado River. CDFG used ESA-Section 6 grants (\$40,000 in FY 83 and \$60,000 in FY 85) to construct the rearing ponds for

(continued on page 10)

Correction: The photograph of the Florida grasshopper sparrow in BULLETIN Vol. XI No. 1 should have been credited to Jeffery A. Cox. The BULLETIN regrets the error.

Three Plant Taxa Proposed for Protection

Three species of plants were proposed by the Fish and Wildlife Service (FWS) during March 1986 for listing as Endangered or Threatened species. If the proposed rules are later made final, the following plants will receive Endangered Species Act protection:

San Rafael Cactus (*Pedilocactus despainii*)

This small species was named for its discoverer, Kim Despain, and for the San Rafael Swell, a large geological upwarp in Emery County, central Utah, upon which the cactus was discovered in 1978. Surveys conducted since that time by various botanists have determined that the San Rafael cactus occurs in only two populations, each containing only 2,000 to 3,000 plants. Both populations, which are located approximately 25 miles (40 kilometers) from each other, are subject to habitat damage and overcollection. For these reasons, the FWS has proposed to list the San Rafael cactus as Endangered (F.R. 3/27/86).

Most of the cacti are in areas currently administered by the Bureau of Land Management (BLM), although some are on State of Utah lands. The type locality, which is near a popular camping area, is being heavily damaged by motorcycles and other off-road vehicles (ORVs). Individual plants have been found growing among crisscrossed motorcycle tracks. Further, approximately half of the area occupied by both *P. despainii* populations contains oil and gas leases and mining claims for gypsum and other minerals. Surface disturbances from associated exploration and from the annual assessment work required to maintain claims is an ongoing threat. Semiarid grasslands are a fragile habitat type, and are easily invaded by exotic and aggressive native plants when disturbed, displacing vulnerable elements of the native flora. Collecting of the cactus by hobbyists or commercial dealers is another potential threat, as *P. despainii* is considered a highly prized species.

One of the San Rafael cactus populations lies within a block of Federal land proposed for land exchange by Utah. If the site were to pass from Federal to State ownership, some benefits that would be available under the Endangered Species Act for its protection would be lost. For example, the prohibition on collecting listed plants without a permit applies only for lands under Federal jurisdiction.

If the listing proposal becomes final, Section 7 of the Act could affect BLM management of the habitat by requiring that agency to restrict recreational vehicle traffic to certain existing roads and to

exercise special care in administering leases and claims.

Comments on the proposal to list the San Rafael cactus as an Endangered species are welcome from all interested agencies, organizations, and individuals, and should be sent to the Field Supervisor, Endangered Species Office, U.S. Fish and Wildlife Service, 2078 Administration Building, 1745 West 1700 South, Salt Lake City, Utah 84104, by May 27, 1986.

Running Buffalo Clover (*Trifolium stoloniferum*)

This short-lived perennial in the pea family (Fabaceae) is one of the four clover species native to the eastern U.S. The running buffalo clover historically occurred throughout a wide range. Documented specimens are available from Kansas, Arkansas, Missouri, Illinois, Indiana, Ohio, Kentucky, and West Virginia. Although the original numbers are not known, it was considered at least locally abundant in some areas. Today, however, the running buffalo clover survives at only one or two very small sites in West Virginia.

The precise reasons for this striking decline are not clear, but it is likely that *T. stoloniferum* was to some extent dependent on the "buffalo" or bison (*Bison bison bison*) that once roamed the eastern U.S. This large grazing animal provided soil enrichment, seed dispersal, and periodic intense disturbance of the habitat (which controlled encroachment of woody plants.) After

the extirpation of bison from the east, the abundance of the running buffalo clover decreased. Other factors contributing to the species' demise could include clearing of its habitat for livestock grazing and growing crops, competition with introduced weedy plants, and other ecological changes.

By 1983, a published review of the running buffalo clover concluded that the species was possibly extinct. In summer 1984, however, two populations were located in West Virginia by Rodney Bartgis, who was then with the West Virginia chapter of The Nature Conservancy. One of the populations occurred at the edge of a mowed field and contained only four individuals. Botanists inspecting the site in summer 1985 were unable to find these plants, and the population probably is extirpated. What may be the only remaining population is located immediately adjacent to an ORV trail in Fayette County that provides access to a short stretch of the New River. A total of 18 plants is concentrated on approximately a single square yard (0.8 square meter) of privately owned land. Due to its low numbers, extremely limited range, and proximity to an ORV trail, the entire population is vulnerable to swift extinction from being run over, trampled, covered by trash, or killed by petroleum pollutants.

The running buffalo clover has been proposed for listing as Endangered (F.R. 3/10/86). Comments on the proposal are welcome, and should be sent to the Annapolis Field Office, U.S. Fish and Wildlife Service, (continued on page 4)



The San Rafael cactus is a small, barrel-shaped species that reaches a maximum height of 2.3 inches (6 centimeters). Its attractive flowers measure about one inch (2.5 cm) wide, and are peach to yellow in color with a bronze tint.

photo by Kenneth D. Hill

Three Plants

(continued from page 3)

Wildlife Service, 1825 Virginia Street, Annapolis, Maryland 21401 by May 10, 1986.

Loch Lomond Coyote-Thistle (*Eryngium constancei*)

Despite its common name, this plant is not a thistle but an herb in the parsley family (Apiaceae). The plant is found only on the bed of Loch Lomond, a 7-acre (2.8-hectare) vernal lake in southern Lake County, California. Rain fills the lake bed in winter, but the waters evaporate in spring and early summer, leaving a seasonal meadow-like area in which *E. constancei* and other plants sprout, flower, and set seed. The volcanic soils of the lake basin, together with its particular hydrological characteristics and the surrounding topography, may account for the unique presence of the coyote-thistle. Two other vulnerable plant taxa found growing on the lake bed, the few-flowered navarretia (*Navarretia pauciflora*) and the many-flowered navarretia (*N. pleantha*), are Category-2 candidates

for Federal listing under the Endangered Species Act.

Approximately 15 percent of the coyote-thistle habitat was destroyed in July 1984 by an illegal dredge-and-fill operation. Because the landowner failed to secure the proper permits, he was fined by the county and ordered by the State to restore the damaged lake bed. However, his continuing plans to dredge and fill the entire lake bed, thereby threatening the coyote-thistle with swift extinction, led the FWS to give the plant emergency protection as an Endangered species on August 1, 1985. (See feature in BULLETIN Vol. X No. 9). This temporary classification expired March 29, 1986; the March 26, 1986, proposed listing will, if approved, make the protection permanent. In addition to the proposed dredge-and-fill project, the lake bed is being damaged by the dumping of trash and by heavy ORV use during the dry summer.

Section 404 of the Federal Water Pollution Control Act (Clean Water Act) makes the U.S. Army Corps of Engineers (COE) responsible for regulating the discharge of dredged or fill material into U.S. waters, including seasonal wetlands like Loch Lomond. The land-

owner would need a COE permit to carry out his proposed modification of the lake. Under Section 7 of the Endangered Species Act, the COE is required to confer with the FWS on any of its actions, including issuance of permits, that are likely to jeopardize the survival of a species proposed for listing.

Comments on the proposal to list the Loch Lomond coyote-thistle as an Endangered species are welcome, and should be sent to the Regional Director, Region 1 (address on page 2 of the BULLETIN), by May 26, 1986.

Available Conservation Measures

If these listing proposals later become final, all three plants will receive the maximum protection authorized under the Endangered Species Act. Among the conservation benefits provided by the Act are prohibitions on interstate or international trafficking in listed species without a Federal permit; the requirement for the FWS to develop and implement recovery plans; and the possibility of Federal funding of State endangered species conservation programs for those States that have approved cooperative agreements with the FWS. (California is among the States that have a signed agreement.)

Habitat conservation is addressed in Section 7 of the Act, which requires Federal agencies to ensure that any actions they fund, authorize, or carry out are not likely to jeopardize the survival of any listed species. If an agency finds that one of its activities may affect a listed species, that agency is required to consult with the FWS to find ways of achieving project goals while avoiding jeopardy to the species. Early planning almost always prevents potential conflicts.

Section 9 of the Act makes it illegal to remove for possession listed plants from lands under Federal jurisdiction, without a Federal permit. This provision will apply to the San Rafael cacti on BLM lands if the species is listed. The other two plant taxa occur on non-Federal property and would not receive Federal protection from collection; however, State laws and regulations may apply.



photo by Jim Bartel

When its shallow waters seasonally evaporate, Loch Lomond becomes a meadow-like area that is the sole habitat of the Loch Lomond coyote-thistle.

Seven Species

(continued from page 1)

the vegetation of Mauna Kea. Although the remaining natural population of the Mauna Kea silversword has been fenced by the State of Hawaii, the enclosure is too low to be effective against the more recently introduced mouflon sheep, which threaten the plant's survival by grazing and browsing. The severity of this threat, in addition to the horticultural and ornamental interest in the plant, prompted the FWS to propose the

Mauna Kea silversword for listing as Endangered on March 6, 1985. (See story in BULLETIN Vol. X No. 4.) On March 21, 1986, the final rule was published.

Minnesota Trout Lily

The only plant species known to be endemic to the State of Minnesota, the Minnesota trout lily (*Erythronium pro-pullans*) is found at 26 small sites in Rice and Goodhue Counties along the Cannon, Straight, and Zumbro Rivers. This

member of the lily family grows to about 6 inches (15 centimeters) tall and has one pair of mottled green, pointed leaves arising from near the base. A single bell-shaped flower, ranging from pink to pale violet to gray-white, appears in April or May at the end of a slender, leafless stalk.

Approximately 8,000 plants are estimated to exist, some occurring on privately owned property and some on conservation lands. Although four of the populations are protected (one found

(continued on next page)

within a State park, one within a nature center, and two on land owned and managed by The Nature Conservancy), they still could be lost through inadvertent habitat alteration or natural population fluctuations. Several colonies of the Minnesota trout lily were destroyed some years ago by road construction, agricultural development, and recreational activities; many of the remaining plants still face similar threats. Wildflower collectors could also reduce populations at the more accessible sites.

On May 3, 1985, the Minnesota trout lily was proposed for listing as Endangered due to the variety of human-related and natural problems it faces (see BULLETIN Vol. X No. 5). *E. pro-pullans* is officially listed as endangered by the State of Minnesota and is afforded limited protection from taking, transporting, and sale under State law. With the March 26 publication of the final rule, this species now receives additional protection under the Federal ESA.

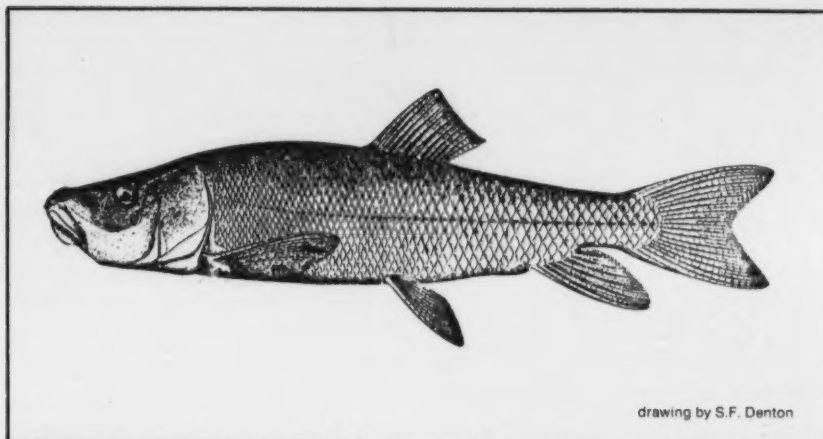
Hymenoxys texana

This member of the aster family is a small, single-stemmed or branching annual that reaches up to 3.9 inches (10 cm) tall with yellowish blooms that appear in late March to early April. Growing in poorly drained swales or depressions in open grasslands, the species occurs in the northern part of the Gulf Coastal Prairie. Only a single known population of *H. texana* currently exists, and it is located near Houston, Texas, in Harris County.

The most serious threat to this species is habitat destruction. At the time the proposed rule to list *H. texana* as Endangered was published (March 6, 1985), three populations of the species were known to survive (see BULLETIN Vol. X No. 4). Since then, however, two of the populations have been destroyed by residential development, and the remaining plants are currently jeopardized by the same threat. If the development continues as anticipated, the species could become extinct. With the final protection of the ESA now on its side (F.R. 3/13/86), however, the destiny of this Texas plant may improve.

June Sucker

The June sucker (*Chasmistes liorus*) is a fish that is endemic to Utah Lake, the largest freshwater lake located entirely within the State of Utah. It uses the lower portion of the Provo River, the largest tributary of the lake, for spawning and larval rearing. Although this fish was once extremely numerous and an important part of the commercial fishery of Utah Lake, it has drastically declined over the years due to habitat alteration, competition and predation by exotic species, and illegal killing of adults dur-



June sucker

drawing by S.F. Denton

ing the spawning run. Recent population estimates for the June sucker are not available, but it is suspected that fewer than 1,000 adult fish currently exist.

Habitat modification, a major factor in the species' decline, has occurred through the diversion of water for irrigation, municipal, and industrial purposes. The possibility of further modification associated with the Central Utah Project, a federally funded water development system now under construction, could impact the spawning habitat of the June sucker. Another threat to the survival of *C. liorus* is competition and predation from over 20 exotic fish species that have been introduced in Utah Lake during the past 100 years. These detrimental factors, in addition to the illegal killing of the species that occurs, prompted the FWS to propose the June sucker for listing as Endangered on July 2, 1984 (see BULLETIN Vol. IX No. 8),

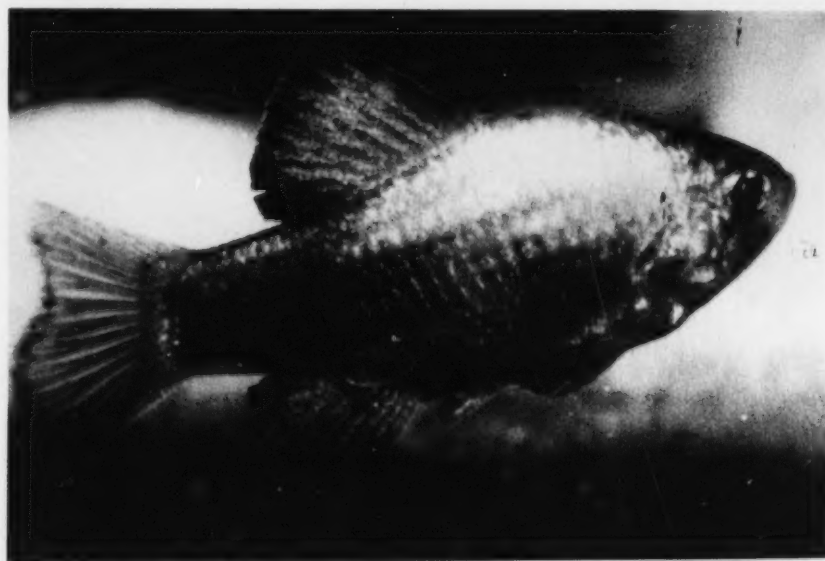
and subsequently to publish the final listing rule (F.R. 3/31/86).

A designation of Critical Habitat is included as part of the final rule. The area comprises the lower section of the main channel of the Provo River from Utah Lake upstream to the Tanner Race diversion. There is a possibility that the Municipal and Industrial System of the Central Utah Project could affect the June sucker's Critical Habitat. Formal interagency consultation with the FWS under Section 7 of the ESA will be required to prevent any adverse impacts to the Critical Habitat.

Desert Pupfish

Another western fish listed as Endangered on March 31, 1986, the desert pupfish (*Cyprinodon macularius*) was once common in the desert springs, marshes,

(continued on next page)



The desert pupfish is a small, laterally-compressed fish with a rounded body shape. Adults rarely grow larger than 2 inches (75 mm) in total length.

photo by Robert K. Liu

Seven Species

(continued from page 5)

and tributary streams of the lower Gila and Colorado River drainages in the States of Arizona and California, and in Mexico. It formerly occurred also in the slow-moving reaches of some large rivers, including the Colorado and Gila, as well as the San Pedro and Santa Cruz. Currently, the species is known from only two of its historical locations in the United States (Salton Sea tributaries in California, Quitobaquito Spring in Arizona), and it is believed to inhabit the Colorado River system in the Rio Sonoyta drainage and Santa Clara Slough in Sonora, Mexico, although recent surveys indicate that the Mexico populations may not be viable.

During the 1880's, many desert rivers began experiencing major erosional cycles due to overgrazing, resulting in permanent water loss in numerous desert pupfish streams and the drying up of the shallow, littoral areas preferred by the species. The construction of mainstream dams for irrigation and flood control also eliminated the marshy sidepools in the Colorado River that were utilized by desert pupfish; this, in turn, forced them into areas where they were vulnerable to predators or outcompeted by native and exotic species. Although the desert pupfish is extremely hardy in many respects, it cannot tolerate predation or unnatural competition, and thus it is readily displaced by exotic fishes. These factors, in combination with adverse effects to the species from the application of agricultural pesticides, have reduced desert pupfish numbers in most habitats to such low levels that long-term survival prospects are poor.

Critical Habitat was designated in the final listing rule for the desert pupfish to include an area of Quitobaquito Spring in Pima County, Arizona, and sections of San Felipe Creek, Carrizo Wash, and Fish Creek Wash in Imperial County, California. The Critical Habitat areas are comprised of both private and Federal lands. The Federal agencies involved (National Park Service and Bureau of Land Management) have informed the FWS that the habitat is not expected to be adversely affected by any of their current activities.

Railroad Valley Springfish

The Railroad Valley springfish (*Crenichthys nevadae*), proposed for Endangered Species Act listing on April 17, 1984 (see BULLETIN Vol. IX No. 5), is native to six thermal springs in Railroad Valley, Nye County, Nevada, and has been introduced into three springs outside of its historical distribution. All of the species' habitats have been altered by human activities, resulting in decreased springfish populations throughout its range.

The diking of springpools, diversion and channelization of outflow creeks, and pumping of underground aquifers have reduced suitable habitat for the Railroad Valley springfish. The presence of exotic fishes in the extremely limited habitat of the species also poses a serious threat to its survival. Exotic fishes are increasing in Nevada waters, especially in spring systems in the southern portion of the State, and they are eliminating or severely decreasing many native fish populations.

On March 31, 1986, a final rule was published in the *Federal Register* to list the Railroad Valley springfish as a Threatened species. As part of the final

rule, Critical Habitat was designated for the species to include the six springs within its historical range, their outflow pools, and associated streams and marshes located in two areas of northeastern Nye County. A 50-foot riparian zone around the springs was also included to protect and maintain the physical and chemical characteristics of the aquatic environment. The area designated as Critical Habitat does not include the entire habitat of this species; however, all waters inhabited by the fish will receive protection under the ESA.

Available Conservation Measures

Among the conservation measures that are now available to each of these newly listed species are a requirement for the FWS to develop and implement recovery plans, possible Federal funding, and prohibitions from certain practices, such as interstate and international trafficking in these species without a permit.

Under Section 7 of the Endangered Species Act, Federal agencies are required to ensure that any actions they fund, authorize, or carry out are not likely to jeopardize the survival of a listed species or its Critical Habitat. The Federal agencies involved with these listing rules are aware of their responsibilities to protect listed species. These Section 7 provisions apply to all seven newly listed species, even though a formal designation of Critical Habitat was not part of the final listing rules for the plants.

Under Section 9 of the Act, the take of listed animals without a Federal permit is prohibited, except for the Railroad Valley springfish, which is threatened by habitat alteration or disturbance rather than direct taking. For this species, a special rule allows take for special purposes (e.g., educational, scientific, enhancement of propagation) without the need for a Federal permit, if a State collection permit is obtained and all other State wildlife conservation laws are satisfied. For listed plants, the rule is different; it is unlawful to remove Endangered plants from only those lands that are under Federal jurisdiction. This protection now applies to *Achyranthes rotundata*, which is found on U.S. military lands. State laws against taking these species, however, may apply.



photo by Tom Baugh

The presence of exotic fishes in the extremely limited habitat of the Railroad Valley springfish presents a serious threat to this species.

Reference Note

All Fish and Wildlife Service notices and proposed and final rules are published in the *Federal Register* in full detail. The parenthetical references given in the BULLETIN—for example: (F.R. 9/3/85)—identify the month, day, and year on which the relevant notice or rule appeared in the *Federal Register*.

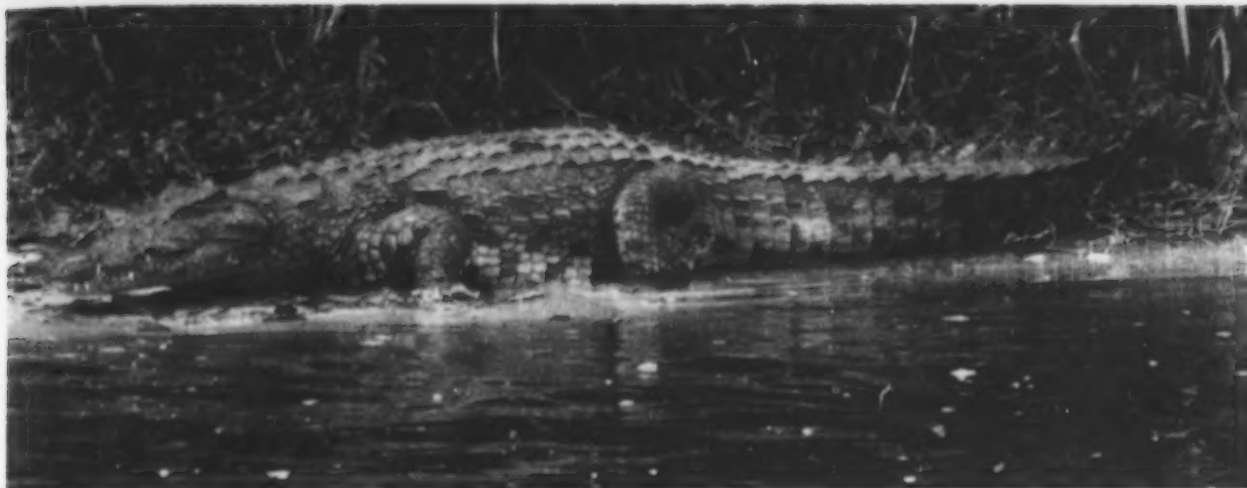


photo by Norman Myers, courtesy of World Wildlife Fund-U.S.

Nile crocodile

Reclassification Proposed for Ranched Nile Crocodiles in Zimbabwe

The FWS has proposed reclassifying ranched populations of the Nile crocodile (*Crocodylus niloticus*) in Zimbabwe from Endangered to "Threatened due to Similarity of Appearance" (F.R. 3/7/86). Such a reclassification, authorized under Section 4(e) of the Endangered Species Act, would constitute an acknowledgement by the FWS that the ranched populations have recovered but that certain trade regulations are needed to protect Endangered wild populations. The reclassification also would allow regulated U.S. trade in animals from these populations, subject to all provisions of U.S. and Zimbabwe laws and provided that the requirements of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) are satisfied. Crocodiles in all other populations, including wild populations in Zimbabwe, will remain listed as Endangered, and their importation into the U.S. for trade will continue to be prohibited.

Historically, the Nile crocodile occurred throughout much of Africa and along the Mediterranean coast as far west as Tunis and as far north as Syria. Today, however, it is confined to the lower Nile, tropical and southern Africa, and Madagascar. Its decline was due to overexploitation for the leather industry, killing because of potential threats to people or livestock, and a mistaken notion that crocodiles compete for desirable fish species. The Nile crocodile was listed by the FWS as Endangered throughout its range in 1970.

Some crocodile populations are continuing to decline, while others apparently have stabilized or are even increasing. In some areas, including parts of Zimbabwe, the damming of swiftly flowing rivers to create lakes and

lagoons has increased the amount of habitat available for the crocodile. Zimbabwe, along with a number of other African countries, now recognizes the crocodile as a valuable natural and economic resource to be maintained.

At the 1983 CITES conference in Botswana, ranched populations of the Nile crocodile in Zimbabwe were moved from Appendix I to Appendix II. As a result, ranched specimens from Zimbabwe may be traded under CITES upon issuance of an export permit by that country's wildlife management agency. It is expected that most crocodile hides will be exported to European countries. The Appendix I classification of wild crocodile populations in Zimbabwe has not changed.

At present, there are five crocodile ranches in Zimbabwe, and they cumulatively collect less than 10,000 crocodile eggs from the wild each year under a permit from that country's wildlife management agency. The eggs are incubated at the ranches, and the young crocodiles are raised until they are approximately 5 feet (1.5 meters) in length, when they are killed and skinned. Although eggs collected under permit supply the bulk of the ranched crocodiles, attempts are being made to supply future needs for eggs from breeding stocks maintained at the ranches. The ranches also are required to release 5 percent of those crocodiles reared from wild collected eggs back into the wild.

Comments on the proposal to reclassify ranched populations of the Nile crocodile in Zimbabwe from Endangered to "Threatened due to Similarity of Appearance" are welcome from all interested parties, and should be sent to the Associate Director - Federal Assist-

ance, Office of Endangered Species, U.S. Fish and Wildlife Service, Washington, D.C. 20240 by May 6, 1986.

Other Regulatory Changes

At the 1985 CITES conference in Buenos Aires, Argentina, wild populations of the Nile crocodile in nine countries (Zimbabwe not among them) also were moved from Appendix I to Appendix II and made subject to annual export quotas totalling 11,670 per year. As a result, the allowed number of specimens from these wild populations can be traded legally by most CITES parties, under the rules for Appendix II species. However, the March 7 proposal to reclassify ranched crocodiles in Zimbabwe under the Endangered Species Act does not apply to any wild populations, and importation into the U.S. of wild crocodiles or products made from them for commercial trade purposes remains prohibited under the Act.

On March 20, 1986, however, the FWS received a petition from Safari Club International to reclassify all wild populations of the Nile crocodile throughout its range from Endangered to Threatened (not "Threatened due to Similarity of Appearance") and to publish a special rule allowing import into the U.S. of legally taken sport-hunted crocodile trophies. In accordance with Section 4(b)(3)(A) of the Endangered Species Act, the FWS will issue a finding within 90 days of the petition's receipt as to whether or not substantial information has been presented that the petitioned action may be warranted and a status review should be initiated. The finding will be published in the *Federal Register*.

Efforts Continue in Southeast to Save Manatees

Region 4

Within the past year, the FWS has been active in Florida and Puerto Rico to save the Endangered West Indian manatee (*Trichechus manatus*). In Florida, studies of seasonal movements and habitat use have begun at Fort Myers, and a lagoon at Port Everglades has been modified to replace lost habitat. In Puerto Rico, information has been compiled that will help biologists assess the impacts of proposed activities on the manatee there.

Biologists with the FWS Sirenia Laboratory in Gainesville, Florida, recently captured and radio-tagged 19 manatees at the Florida Power and Light Company's warm water discharge canal at Fort Myers. This is the site of the largest winter aggregation of manatees in Florida, with 330 manatees recorded at the power plant and nearby Caloosahatchee River during the winter of 1984-1985. Manatees were instrumented with 16 VHF radio transmitters and three satellite radio transmitters to determine seasonal movements and habitat use in southwest Florida. Over 30 other biologists and volunteers from the FWS, Florida Department of Natural Resources, Florida Audubon Society, and other agencies and organizations assisted Sirenia project personnel in the captures on January 6-7 and 27-28.

Manatees have been provided a safe refuge away from dangerous boat traffic in Port Everglades. Approximately one year ago, the FWS Jacksonville Endangered Species Office was involved in an Endangered Species Act-Section 7 consultation with Port Everglades authorities in Broward County concerning the

construction of a new berthing facility at the port. Shallow water habitat used by the manatee would be removed by development of the project. Manatees use the port facility extensively during the winter months to take advantage of a warm water discharge from a power plant.

To offset the loss of shallow water habitat, a plan was developed to create other habitat in a small lagoon owned by the port located adjacent to the warm water discharge canal. Manatees historically used this lagoon, but it was very shallow and most of it was unuseable during low tide. The plan was to dredge out the lagoon to a sufficient depth to allow manatees to use the area through all tidal cycles. In addition, at one end of the lagoon there was a plugged canal that once had been connected to the warm water discharge canal. The plug was to be removed to allow some of the warm water to be diverted into the lagoon, with the hope that manatees would begin to use this area as a refuge.

Work on the project was completed prior to this past winter season, and the first reports on manatee use are favorable. Compared to previous counts, more manatees are seen in the lagoon and are staying in the area throughout the tidal cycles. The port has initiated a study to record water temperatures in the lagoon and to monitor manatees in the area. The removal of the plug has diverted warm water into the lagoon, and has increased flushing.

In Puerto Rico, results from a recent U.S. Navy-funded study on the distribution of manatees provide information needed to assess impacts of proposed

activities. The report, entitled "The Distribution of Manatees and Sea Turtles in Puerto Rico, with Emphasis on Roosevelt Roads Naval Station," was prepared by Galen B. Rathbun, Thomas Carr, Nicole Carr, and Charles A. Woods. Monthly aerial surveys were conducted around Puerto Rico and weekly aerial surveys were conducted on Roosevelt Roads Naval Station (RRNS). Manatees were also surveyed from shore at the RRNS sewage treatment plant outfall (fresh water source) on a biweekly basis.

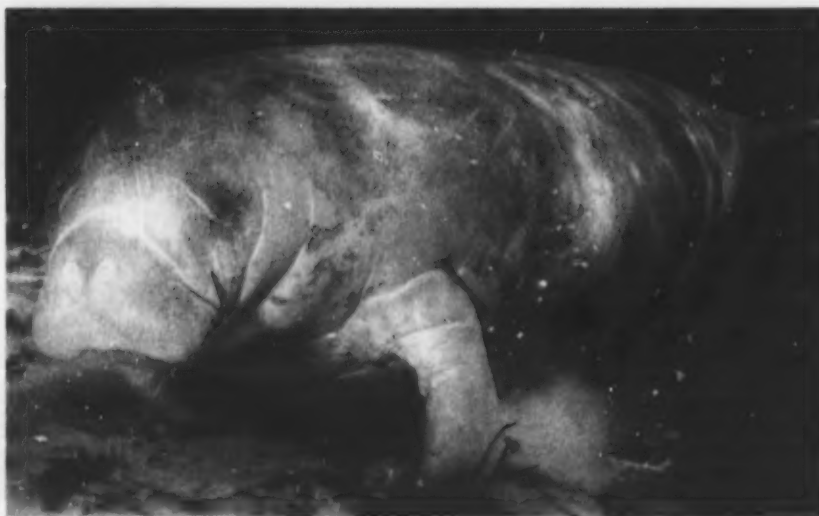
Most manatees were sighted in shallow, protected areas with submerged aquatic vegetation and a fresh water source. Over 50 percent were sighted along Puerto Rico's south coast and over 30 percent along the east coast (including RRNS and the northwest coast of Vieques Island). Lack of seasonal trends in the numbers of manatees sighted and the observation of calves throughout the year suggest that there is no well-defined breeding season.

Nevada Fish is Found Not in Danger

Because of new information indicating that the Fish Creek Springs tui chub (*Gila bicolor euchila*) is more abundant and widely distributed than once thought, and because threats faced by this fish have been removed, the FWS has withdrawn its 1984 proposal to list the subspecies as Threatened (F.R. 3/10/86).

This tui chub, which is endemic to the Fish Creek Springs system in Eureka County, Nevada, previously was considered vulnerable to predation by introduced sport fish species and by the harmful impacts of overgrazing livestock. It was proposed for listing on June 6, 1984 (story in BULLETIN Vol. IX No. 6). Subsequent status surveys in 1984 and 1985 found larger than expected numbers of tui chub fry. The increase could be due, at least in part, to reductions in the number of predatory, non-native sport fishes stocked into Fish Creek Springs. The Nevada Department of Wildlife has halted stocking of brown trout (*Salmo trutta*) and has reduced releases of rainbow trout (*S. gairdneri*). In addition, riparian vegetation is present around the springs and siltation is not a significant threat at this time.

The FWS will continue to monitor the fish and its habitat for future changes.



West Indian manatee

photo courtesy of Florida Power & Light Company

Ferret Fund Increases

by Al Langston

Wyoming Game and Fish Department

Donations to the Wyoming Game and Fish Department (WGFD) for the black-footed ferret program continue to come in, with more than \$6,000 received as of early March.

Funds have come from a variety of sources. Ten-year-old Toni Bonazza of Lander, Wyoming, donated \$12 from money she received for her birthday. Many other donations have been received in varying amounts from private individuals, as well as \$300 from Defenders of Wildlife.

School children have been particularly active in fundraising events. Since the first of the year, donations have come in from the following Wyoming schools: the Grant School 3rd grade in Casper; the 4th, 5th and 6th grades from Washington School in Laramie; the Lincoln Middle School Flora and Fauna Class in Green River; and the Lebhart School 2nd grade in Cheyenne. Donations also have come in from Jefferson



photo courtesy of Wyoming Game and Fish Department

Black-footed Ferret

County Open High School in Evergreen, Colorado.

WGFD Director Bill Morris thanks all those involved for their interest in the black-footed ferret project and other WGFD activities. "Without this kind of support," he said, "it would be difficult to

maintain Wyoming's wildlife resources at the quality we know and enjoy."

Anyone wishing to contribute to the ferret program should send donations to the Wyoming Game and Fish Department, Cheyenne, Wyoming 82002, Attention: Black-footed Ferret Fund.

Critical Habitat Proposal for Two Key Largo Species is Withdrawn

The FWS has withdrawn (F.R. 2/18/86) its proposal to designate Critical Habitat for two rare rodents of southern Florida, the Key Largo woodrat (*Neotoma floridana smalli*) and the Key Largo cotton mouse (*Peromyscus gossypinus allapaticola*). Both subspecies were proposed for listing as Endangered with Critical Habitat on February 9, 1984. The Endangered listings became final on August 31, 1984, but the designation of Critical Habitat was deferred at that time in order to expedite the listing action.

Following the original proposal to list the two rodents as Endangered with Critical Habitat, certain landowners on North Key Largo expressed an interest in development of a Habitat Conservation Plan (HCP) pursuant to Section 10(a) of the Endangered Species Act. Under this provision, the FWS may issue a permit authorizing the take of listed species, incidental to otherwise lawful activities, provided that (among other things) the permit application is supported by an approved HCP. Implementation of such an HCP must ensure the long-term conservation of the species and must not appreciably reduce the species' likelihood of survival and recovery in the wild. Subsequent to the listing of the two Key Largo mammals, Congress allocated \$98,000, to be matched

with non-Federal funds, for use in developing an HCP. The FWS, which was charged with administering the congressional funding, entered into a grant agreement with the Florida Department of Community Affairs to prepare (in cooperation with Monroe County) an HCP for North Key Largo.

Between the land already acquired for Crocodile Lake National Wildlife Refuge and Florida Department of Natural Resources conservation projects, over half of the habitat occupied by the woodrat and cotton mouse on North Key Largo is publicly owned. The remainder, which is privately owned, would be subject to the beneficial conservation provisions of the HCP. Under the projected plan, most development probably would take place without widespread destruction of hardwood hammocks, with development to be clustered, particularly in areas that already have been cleared. Both animals require natural habitat, and avoid cleared or developed areas.

Under Section 7(a)(2) of the Act, Federal agencies are required to ensure that their activities are not likely to jeopardize the survival of a listed species, even when Critical Habitat has not been designated. Because of this, and because of the intensive land acquisition and planning processes now occur-

ring on Key Largo, the habitat of the two rodents has already been well delineated. No additional benefit would accrue from a formal Critical Habitat designation.

A draft HCP should be available for public review in the near future. Before a final decision on issuance of an HCP is made, an environmental impact statement on permit consequences will be developed.

BULLETIN Available by Subscription

Although we would like to send the BULLETIN to everyone interested in endangered species, budgetary constraints make it necessary for us to limit general distribution to Federal and State agencies and official contacts of the Endangered Species Program. However, the BULLETIN is being reprinted and distributed to all others, on a non-profit subscription basis, by the University of Michigan. To subscribe, write to the *Endangered Species Technical Bulletin Reprint*, School of Natural Resources, University of Michigan, Ann Arbor, Michigan 48109-1115, or telephone 313/763-1312. The price for 12 monthly issues is \$12.00 (in Canada, \$17 US).

Condor Update

The first egg produced by the only remaining breeding pair of California condors (*Gymnogyps californianus*) was found broken in early March, probably the result of its extremely thin shell. As of April 8, biologists watching the pair did not know if the female will lay another egg this season. Only five California condors remain in the wild, and four of them are males.

Currently, there are another 21 condors in captivity at zoos in San Diego and Los Angeles, 13 females and 8 males. Two of the females are adults, one of the male. An adult, and another male is approaching maturity and could

be of breeding age; the other condors are immatures. Biologists hope that the captive flocks will produce offspring for release into the wild.

The FWS is appealing a district court decision that bars capture of the five wild condors for safekeeping and captive propagation. Capture of one of the wild males, however, has been authorized by the court since it is the only wild bird not genetically represented in the captive flocks. With such a small number of animals, it is essential to conserve as much of their genetic diversity as possible.

Regional Briefs

(continued from page 2)

growing-out the bonytail and Colorado squawfish.

The San Francisco Bay Bird Observatory recently completed a draft report on the status and distribution of the salt marsh yellowthroat (*Geothlypis trichas sinuosa*), a Category-2 candidate for listing, in the San Francisco Bay area. Based on the 1985 breeding season, the current yellowthroat population includes approximately 570 breeding pairs, considerably more than the 166 pairs counted during the drought years of 1976 and 1977.

Region 2 — A 6½-year-old male whooping crane (*Grus americana*) was captured on Belen State Management Area in New Mexico after it was seen acting abnormally. Subsequent veterinary examination showed that the bird was emaciated, and radiographs indicated large tumor-like growths in the abdominal area. The bird died during surgery to examine the growths, which were found to be tubercles of avian tuberculosis, an untreatable illness.

A second adult whooping crane believed to have been injured near Los Lunas, New Mexico, in early January appears to have almost fully recovered. On March 4, she migrated into Colorado, and she was observed in the San Luis Valley on March 6.

An additional whooping crane was confirmed at Aransas NWR, making a total of 97 birds that reached the Texas coast. Survival of adults and subadults was unusually good during 1985. Eighty-one of the 84 birds that departed Texas in April 1985 returned to Texas this winter. By the end of March, 48 birds had departed from Aransas, heading northward. Migration is about a week earlier than normal.

During early March, the two subadult whooping cranes wintering near Brazo-

ria, Texas, were observed feeding on sprouting corn that had been treated with the chemical Contra G-15 carbofuran, which is known to be highly toxic to waterfowl. The birds were hazed from these sites until they departed to feed in estuarine areas. During late March, the same whooping cranes began feeding on sprouting sorghum grown from seed that had been chemically treated. Again, the birds were hazed until they left these sites.

Personnel from the New Mexico Department of Game and Fish and FWS Region 2 sampled the Pecos River for the bluntnose shiner (*Notropis simus pecosensis*) from Santa Rosa, New Mexico, to the Texas State line. The purpose was to check the status of this species, which is proposed for listing as Threatened (see BULLETIN Vol. IX No 6). Results of the survey will be forthcoming after the 16 samples are sorted and analyzed. Other fishes of note taken during the sampling include the blue sucker (*Cyprinus elongatus*), a Category-2 listing candidate, and the State-listed big-scale logperch (*Percina macrolepidota*).

A meeting held with the National Park Service included a visit to Rattlesnake Springs in Carlsbad Caverns National Park. Plans were made to remove exotic fish species from the springs in order to reintroduce fishes native to the Pecos drainage, including the Endangered Pecos gambusia (*Gambusia nobilis*).

FWS representatives attended a Mexican Wolf Symposium in Saltillo, Coahuila, Mexico, in early March. The symposium was sponsored by the Universidad Autonoma Agraria Antonio Narro and Conservacion Ecologia de los Recursos Naturales. Up to 200 people were in attendance daily, including wolf experts from Italy and Canada. Discussions were held about what might be done to maintain the few wild wolves left and to reestablish the subspecies (*Canis*

lupus baileyi) in parts of its historical range. The U.S. agreed to continued cooperation in the recovery of the wolf and to proceed toward plans for reintroduction. There are currently 27 certified-pure Mexican wolves in captivity in the U.S., and they will be used as the nucleus for reintroduction.

The 1986 Attwater's greater prairie-chicken (*Tympanuchus cupido attwateri*) survey in Texas has counted only 880 birds this spring, a 39 percent decline from 1985 and the lowest number in 21 years. The most notable declines occurred in the southern part of this Endangered prairie-chicken's range, and are attributed to continuing loss of habitat and heavy rains during the hatching period last year.

Birds on the Attwater Prairie Chicken NWR continue to do well, with 204 counted this spring. If this trend continues, the subspecies will soon be limited only to the 8,154-acre (3,300-hectare) NWR; the recovery plan calls for between 3,000 (to reclassify) and 5,000 (to delist) birds on 22,240 acres (9,000 ha) of public and private lands.

Region 3 — An agreement has been reached between the FWS and the Minnesota Department of Natural Resources for the preparation of a recovery plan for the recently listed Minnesota trout lily (*Erythronium propullans*).

Members of the newly appointed recovery team for the central U.S. population of the piping plover (*Charadrius melodus*) met in March to begin developing a recovery plan for the species. A plan also will be developed for the Atlantic Coast population of the plover by a recovery team headed by Region 5.

Region 3 received \$8,300 of Endangered Species Program funds to conduct a status survey on the prairie mole cricket (*Gryllotalpa major*). This Category-2 listing candidate, historically found in Kansas, Illinois, Missouri, Mississippi, and Oklahoma, appears to be threatened by loss of its prairie habitat.

A meeting of the Higgins' Eye Pearly Mussel Recovery Team is scheduled for April 30, 1986, at the National Fisheries Lab in Lacrosse, Wisconsin, in conjunction with the annual meeting of the Mississippi River Research Consortium. The mussel die-off and recent surveys and research are among the topics to be assessed by the team members.

The Indiana/Gray Bat Recovery Team is scheduled to meet on May 1, 1986, at the Museum of Natural History in Washington, D.C. Issues of particular concern to be addressed at the meeting include the recent population declines at a number of important hibernaculae, progress

of the cave-gating study, and summer habitat research.

Region 3 staff members are planning to work with the Hiawatha National Forest staff (in Michigan) on a project to determine the effects of intensive fishery management on eagles. Some concern has been expressed by the local National Audubon Society chapter that lake renovation may be detrimental to eagles in the area.

The Peregrine Falcon Release Group met on March 17. There are plans to release up to 40 peregrine falcons (*Falco peregrinus*) this year from the three Minnesota hacking sites, as well as new release sites in Illinois and Michigan.

A survey report prepared by Dr. Arthur Clarke for the U.S. Army Corps of Engineers on mussels of the St. Francis Floodway and a major tributary in Arkansas revealed interesting data on the Endangered fat pocketbook (*Potamilus capax*). This mussel was found throughout the area surveyed and at 75 percent of the study sites. It was the most common species found there, with an estimated 11,000 to 24,000 post-juvenile individuals in existence. Dr. Clarke has proposed to transplant the species to other rivers, including the White River in Indiana and two sites in the upper Mississippi River.

Region 4 — The Florida semaphore cactus (*Opuntia spinosissima*), a Category-2 listing candidate, has been reported in its native habitat in southern Florida for the first time in a decade. A report made by a private individual to the FWS, the Florida Natural Areas inventory, and a university botanist has stimulated a reappraisal of the status of this species. Although the possibility is still unconfirmed, the plants living in the wild may represent a successful reintroduction of cultivated plants into the site from which they had been taken. Cultivated material is available for reintroduction because this large cactus has had some popularity as an ornamental.

FWS Caribbean Field Office personnel have reviewed the distribution of the Florida semaphore cactus in the Caribbean. The plant is present on the south coast of Jamaica and the Cayman Islands; it is not known to occur in the Bahamas, Puerto Rico, or the Virgin Islands (contrary to the current Notice of Review for plants). The cactus appears not to be present in Mexico.

The Alabama shovelnose sturgeon (*Scaphirhynchus platyrhynchus* ssp.) is a small, undescribed subspecies confined to the Mobile Bay drainage of Alabama and Mississippi. First reported from this system in 1930, the shovelnose sturgeon was initially documented in scientific

literature in 1955. Confirmed records of the species are uncommon. A status survey in 1955 captured only five individuals.

This fish historically ranged in over 1,000 miles of main channel habitat in the Mobile Bay system of rivers; however, only 15 percent of this historical habitat is known to support a population now. Another 24 percent is of marginal value as shovelnose sturgeon habitat. Impoundments, channel modifications, gravel mining, and water flow regulation are the primary threats to this species. The FWS is reviewing the status of the Alabama shovelnose sturgeon to determine if there are enough data available for a decision on whether or not a proposal to list the fish under the ESA is warranted.

A meeting of all agencies involved in sea turtle management at Cape Canaveral took place at Merritt Island NWR on February 28, 1986. Representatives from the refuge; FWS Jacksonville, Florida, Endangered Species Field Station; Canaveral National Seashore, Kennedy Space Center; Bionetics Inc.; and Canaveral Air Force Station reviewed the results of their 1985 sea turtle programs and discussed plans for the 1986 season. In 1985, a total of 4,600 loggerhead (*Caretta caretta*) and 150 green (*Chelonia mydas*) turtles nested on the 37 miles (68 kilometers) of beaches along Cape Canaveral. Approximately 44 percent of the nests hatched successfully, which marks a significant improvement from past years when over 90 percent of the nests were lost to raccoon predation.

The most successful program occurred on Merritt Island NWR, where 95 percent of the nests hatched because of a live-trapping and removal effort directed at raccoons. Canaveral National Seashore erected screens around 40 percent of the sea turtle nests deposited on its beaches. Most of the screened nests hatched, while most non-screened nests were destroyed by raccoons. The Air Force relied on a raccoon live-trapping program with some screening, which resulted in an overall nest success of 34 percent. More intensive nest protection efforts are planned by the Air Force in 1986 if funds permit.

A draft revision of the Florida Panther Recovery Plan has been completed. (The original plan was approved on December 17, 1981.) The draft update delineates new tasks that might be useful in recovery efforts, and reworks the plan into a standardized format common in recent recovery plans. It is being circulated for comment to all Federal and State agencies that are involved in Florida panther (*Felis concolor coryi*) recovery efforts, and to private agencies and individuals who are knowledgeable about panther biology.

Region 5 — Peregrine falcons have been sighted at three sites in New Hampshire and Vermont that were active in 1985. The outlook is optimistic for a banner season.

Region 6 — Whooping crane spring migration monitoring has begun. The 1986 spring flight is the 22nd migration monitored through the cooperation of many people from central Canada and the United States. The Records Center coordinator is Wally Jobman, of the FWS Endangered Species Office in Grand Island, Nebraska. Any sightings should be reported to State contacts as indicated in the Whooping Crane Contingency Plan; the State contacts will then report them to Mr. Jobman.

The information will be used to alert people in key areas of concern along the flyway and to provide sighting records for the Whooping Crane Recovery Plan and current studies in Canada and the United States.

The Wyoming Game and Fish Department (WGFD) has received funds from the FWS to assist with construction of a black-footed ferret (*Mustela nigripes*) captive breeding facility at the State's Sybille Research Unit near Wheatland, Wyoming. Currently, WGFD has four female and two male black-footed ferrets at Sybille. An attempt to breed these ferrets began in February 1986. The possibility of success this year is low because both males and one female are young, inexperienced animals. Success of this program will not be known before April.

Contributions totalling more than \$6,000 have been received by the WGFD Ferret Fund. The money has come from school children, other concerned individuals, and industry. (See story in this BULLETIN issue.)

Region 7 — In the December 1985 BULLETIN, we reported that the Environmental Protection Agency issued an experimental use permit authorizing the FWS to test the use of the toxicant Compound 1080 for eradicating introduced arctic foxes (*Alopex lagopus*) from uninhabited Kiska Island to promote the recovery of the Endangered Aleutian Canada goose (*Branta canadensis leucopareia*) there.

During late March and early April, Alaska Maritime NWR biologist Fred Deines and animal damage control agent Wells Stephensen conducted pretreatment surveys of both target and non-target species on Kiska and successfully dispersed Compound 1080 baits around the periphery of the island. Preliminary results of the treatment are encouraging, as foxes are taking the baits and succumbing. Although this program has

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Regional Briefs

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been controversial, no alternate means to eliminate foxes are feasible on islands as large (695,598 acres), rugged, and remote as Kiska. If the program succeeds, it is hopeful that Aleutian geese and many other species of migratory birds will once again be able to breed on this Aleutian island.

Recovery Plan Update

The following recovery plans were recently approved by the FWS: *El Segundo Blue Butterfly Recovery Plan* (1/22/86); *Curtis Pearly Mussel Recovery Plan* (2/4/86); *Bald Eagle (Pacific States) Recovery Plan* (3/19/86); *Monito Gecko Recovery Plan* (3/27/86); *Puerto Rico Boa Recovery Plan* (3/27/86); and *Virgin Islands Tree Boa Recovery Plan* (3/27/86).

Copies of recovery plans become available for purchase about 6 months from their date of approval. Requests for copies should be made to the Fish and Wildlife Reference Service, 6011 Executive Boulevard, Rockville, Maryland 20852; telephone (toll-free) 800/582-3421.

BOX SCORE OF LISTINGS/RECOVERY PLANS

Category	ENDANGERED			THREATENED			SPECIES* TOTAL	SPECIES HAVING PLANS
	U.S. Only	U.S. & Foreign	Foreign Only	U.S. Only	U.S. & Foreign	Foreign Only		
Mammals	25	20	234	4	0	22	305	23
Birds	60	15	141	3	2	0	221	54
Reptiles	8	6	60	8	4	13	99	21
Amphibians	5	0	8	3	0	0	16	6
Fishes	39	4	11	21	3	0	78	39
Snails	3	0	1	5	0	0	9	7
Clams	23	0	2	0	0	0	25	21
Crustaceans	3	0	0	1	0	0	4	1
Insects	8	0	0	5	0	0	13	12
Plants	92	5	1	23	3	2	126	44
TOTAL	266	50	458	73	12	37	896	228**

*Separate populations of a species, listed both as Endangered and Threatened, are tallied twice. Species which are thus accounted for are the gray wolf, bald eagle, American alligator, green sea turtle, Olive ridley sea turtle, leopard, and piping plover.

**More than one species may be covered by some plans, and a few species have more than one plan covering different parts of their ranges.

Number of Recovery Plans approved: 194

Number of species currently proposed for listing: 25 animals
29 plants

Number of Species with Critical Habitats determined: 95

Number of Cooperative Agreements signed with States: 46 fish & wildlife
25 plants

March 31, 1986

New Publication

Endangered Aquatic Ecosystems in North American Deserts with a List of Vanishing Fishes of the Region, a 62-page report by Jack E. Williams et al., may be ordered from the Desert Fishes Council, 407 W. Line Street, Bishop, California 93514. This 1985 publication contains technical information on the

status of 15 ecosystems of the United States and Mexico; their vanishing fishes, amphibians, reptiles, and invertebrates; and the threats to these species and their habitats. A limited number of copies is available; the only charge is \$1.00 for postage and handling.

April 1986

Vol. XI No. 4

ENDANGERED SPECIES

Technical Bulletin

Department of Interior, U.S. Fish and Wildlife Service
Endangered Species Program, Washington, D.C. 20240

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ENDANGERED SPECIES

Technical Bulletin Department of Interior, U.S. Fish and Wildlife Service
 Endangered Species Program, Washington, D.C. 20240

18 Plants Proposed for Listing Protection

A total of 18 plant taxa were proposed by the Fish and Wildlife Service (FWS) during April 1985 for listing as Threatened or Endangered species. If the proposed listings are later made final, Endangered Species Act protection will be available as an aid to their survival and recovery.

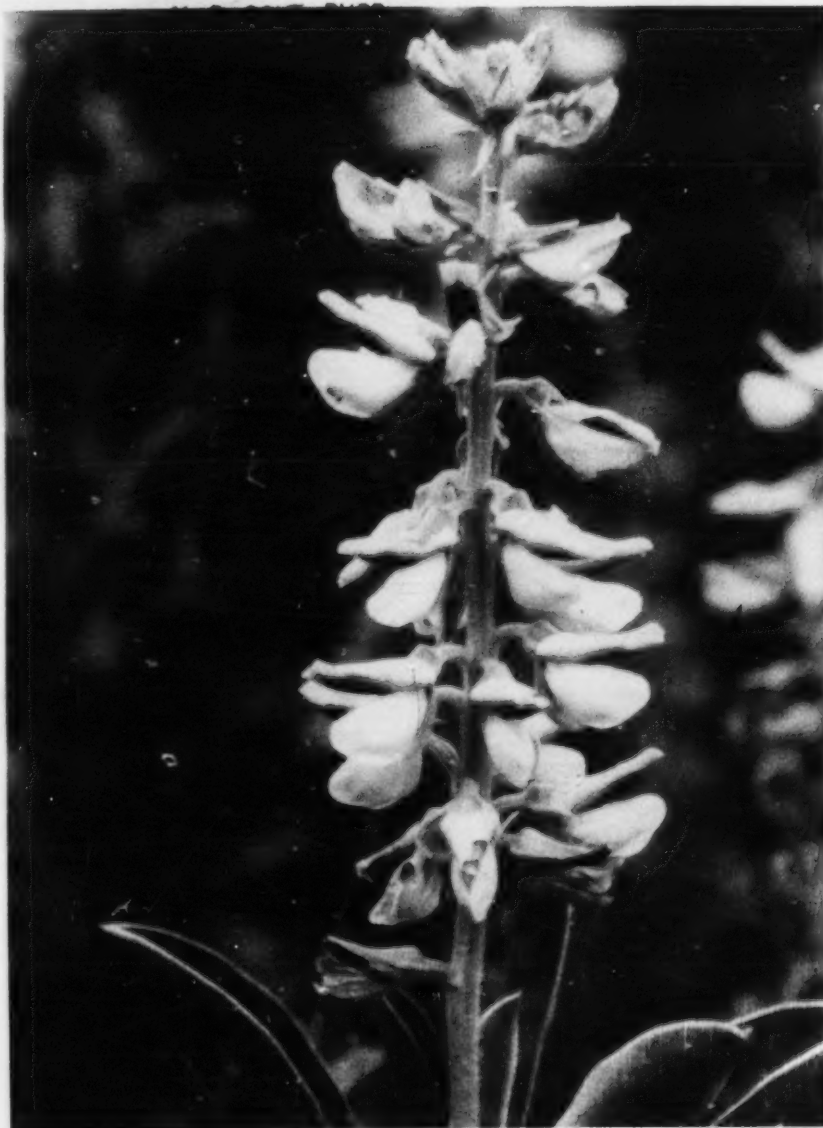
Eight Florida Scrub Plants

The following eight plants are endemic to sand pine/evergreen oak scrub in south-central peninsular Florida, a unique habitat type that is vulnerable to modification or destruction:

• ***Lupinus aridorum* (scrub lupine)**—A biennial or short-lived perennial, this member of the pea family (Fabaceae) grows stems up to 3 feet (1 meter) tall from a soft, woody base. The pale flesh-pink flowers are borne on inflorescences that can reach approximately 5 inches (13 centimeters) in length. *L. aridorum* is known from only 15 sites, all on private lands, and the total population was only 339 plants at last count. Ten of the current sites are in Orange County between the city of Orlando and Walt Disney World. Orlando is one of the fastest growing cities in Florida, and many of the scrub lupine localities are considered prime property for development. The other five sites, in Polk County, also are threatened by habitat loss.

The scrub lupine was proposed for listing as an Endangered species on April 24, 1986. Seven other Florida scrub plants were proposed for listing in a separate notice published on April 10:

• ***Prunus geniculata* (scrub plum)**—This scraggly, heavily branched shrub, which belongs to the rose family (Rosaceae), grows to about 6 feet (2 m) tall. Its twigs are strongly zigzag, with spiny lateral branches, and the deciduous leaves have fine teeth along their margins. The white flowers, which appear in winter, are followed by a bitter, dull-red plum. Roughly 33 *P. geniculata* localities have been reported in Polk, Highlands, and Lake Counties, but none are within protected areas.



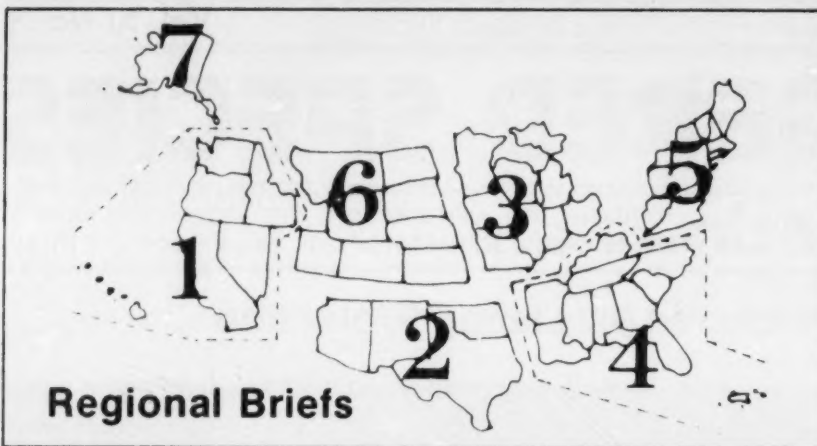
Lupinus aridorum

• ***Chlonanthus pygmaeus* (pygmy fringe tree)**—Another shrub, this member of the olive family (Oleaceae) typically grows up to almost 3 feet (1 m) tall, although specimens up to 13 feet (4 m) high are known. Its

white flowers bloom in late March, and are borne in showy panicles. The species is known from 20 sites, most of them consisting of only a few plants. Six of the sites are on the

(continued on page 6)

photo by Andy Robinson



Regional Briefs

Endangered Species Program regional staffers have reported the following activities for the month of April:

Region 2—A 7-year-old male whooping crane (*Grus americana*) belonging to the Rocky Mountain population was found dead on April 17 at Oxford Slough in Bannock County, southeastern Idaho, where he spent the previous five summers. The carcass was still in good condition when found. Evidence at the scene and from the subsequent necropsy showed that the cause of death was collision with a powerline. The post-mortem examination also indicated that the bird had avian tuberculosis, but apparently in the very early stages.

Fourteen crane researchers, managers, and administrators met in Reno, Nevada, in late March to discuss sexual maturity and pairing behavior in cranes. The meeting included a brainstorming session to increase the chances for pairing and reproduction in the Rocky Mountain whooping crane population. Eight recommendations were developed, with six of them being approved for implementation over the next 12 months.

A sick 4-year-old male whooping crane in the Rocky Mountain flock was discovered in the San Luis Valley of Colorado on April 9 and was transported to the Rio Grande Zoological Park in Albuquerque, New Mexico. The bird was emaciated, but preliminary tests failed to determine the cause. Its condition subsequently worsened to the point that it was euthanized to end the bird's suffering. A necropsy revealed that the whooper had avian tuberculosis, a disease for which there is no known antibiotic. This was the third case of avian tuberculosis in the Rocky Mountain whooping crane population this spring. The crane first determined to have the disease died in March.

As part of a Woundfin Recovery Team meeting held in St. George, Utah, on April 14-15, woundfin (*Plagopterus argentissimus*) populations were monitored in the Virgin River. The results indicate that the red shiner (*Notropis lutrensis*) continues to expand its range up the river. Competition with this exotic is a primary reason for depressed woundfin populations. Continued monitoring of the Virgin River will be required to fully determine the impact of red shiners on woundfin populations. Despite problems experienced last year with an increase in salinities and decreased flows in the Virgin River, woundfin did reproduce in the upper portions of the river. A few Virgin roundtail chub (*Gila robusta seminuda*) also were discovered during the monitoring for woundfin. This chub is expected to be proposed for listing in the near future.

The Apache Trout Recovery Team met April 28 at Pinetop, Arizona. Items discussed at the meeting included the successful rearing of the Apache trout (*Salmo apache*) at Williams Creek National Fish Hatchery. Due to this success, Apache trout from this hatchery will be reintroduced into streams on U.S. Forest Service lands. This marks the first time hatchery-cultured Apache trout have been reintroduced. The hatchery hopes to produce 100,000 Apache trout next year.

The second meeting of the Desert Fishes Recovery Team was held this month at the Tucson headquarters of the Arizona Game and Fish Department.

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U.S. Fish and Wildlife Service Washington, D.C. 20240

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Five Clams Believed in Danger of Extinction

Five freshwater clams, all restricted to areas in the Tombigbee River system in Mississippi and Alabama, were proposed by the FWS on April 7, 1986, for listing as Endangered species. Much of their historical habitat has been modified by reservoir and barge canal construction, and the remainder is threatened by siltation and gravel dredging. The modification of the free-flowing Tombigbee River into a series of impoundments to form a barge canal has also resulted in direct destruction of these clams:

Marshall's mussel (*Pleurobema marshalli*), a bivalve mollusk about 60 mm long, 50 mm high, and 30 mm wide, was historically known from the Tombigbee River main stem just above Tibbee Creek near Columbus, Mississippi, down to Epes, Alabama. The only remaining viable habitat for this species in the Tombigbee River is a gravel bar in a bendway (a loop cut off from the river) in Sumter County, Alabama. A few individuals may survive in two of the river's bendways, one in Lowndes County, Mississippi, and one in Pickens County, Alabama.

Curtus' mussel (*P. curtum*) is about 50 mm long, 35 mm high, and 30 mm wide with a green to greenish-brown, subtriangular shell and a thin bluish-white, iridescent nacre (also known as mother-of-pearl). Historically found in the main stem of the Tombigbee, the only currently viable habitat remains in the East Fork-Tombigbee in Mississippi. A few individuals may remain in a bendway of the Tombigbee in Pickens County, Alabama.

Similar in size to Curtus' mussel, the **Judge Talt's mussel (*P. taltianum*)** is brown to brownish-black, obliquely triangular, and inflated. This clam was historically found in the Tombigbee River from Tibbee Creek near Columbus, Mississippi, to Demopolis, Alabama, and from parts of the Alabama, Cahaba, and Coosa Rivers, all in Alabama. Only four suitable sites remain: a bendway of the Tombigbee River in Sumter County, Alabama; the East Fork-Tombigbee in Mississippi; the Buttahatchie River in Mississippi; and the Sipsey River in Pickens and Green Counties, Alabama.

Historically found in the Tombigbee from Tibbee Creek downstream to Epes, Alabama, and the Black Warrior and Alabama Rivers, the **stirrup shell (*Quadrula stapes*)** is about 55 mm long, 50 mm high, and 30 mm wide. The shell is yellowish green with green, zigzag markings that become brown as the species matures. Only two small areas of suitable habitat remain, one in the Sipsey River and the other in a bendway of the Tombigbee. Two additional bendways of the Tombigbee may support a few specimens.



photo by Jim Williams

The Sipsey River in Alabama in one of the few rivers that provides suitable habitat for the Judge Talt's and stirrup shell mussels.

The **penitent mussel (*Epioblasma penita*)** is 55 mm long, 40 mm high, and 34 mm wide, has a yellowish, greenish-yellow, or tawny shell, and a radially sculptured posterior. The species was historically known from the Tombigbee, Alabama, Cahaba, and Coosa Rivers, but now remains only in the Buttahatchie River, the East Fork Tombigbee, and a single locality in a bendway of the Tombigbee in Pickens County.

All five clams have greatly declined in range and/or numbers because of the alteration of their free-flowing riverine habitat to an impounded river system by

(continued on page 4)

Five Clams

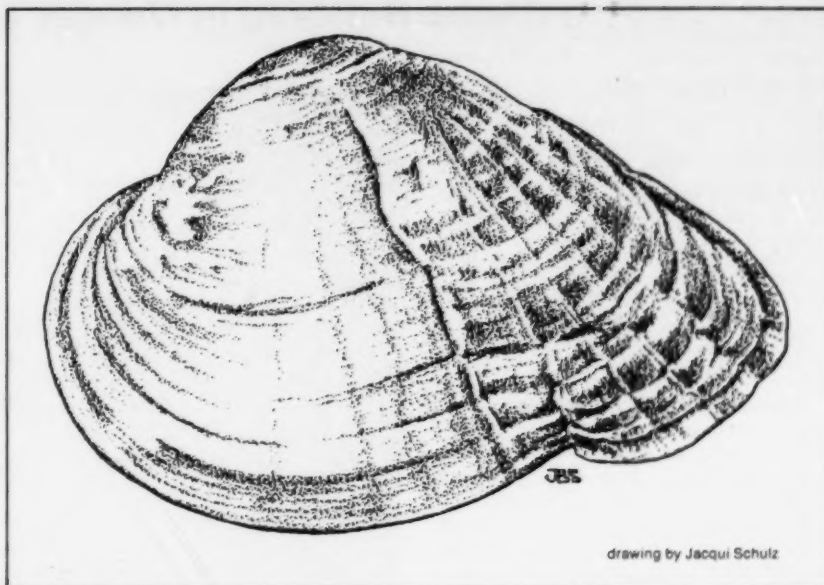
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the construction of the Tennessee-Tombigbee Waterway (TTW). The modification of the river to a series of impoundments adversely impacted these species by physical destruction during dredging, increased siltation, reducing water flow, and suffocating juveniles with sediment. They now survive only in areas that were bypassed by the TTW and in lower portions of some of the larger tributaries. Dredging and snagging for flood control threaten these remaining populations.

Low population numbers and a limited range increase the vulnerability of these rare clams to collecting, both for private collections and scientific purposes. The isolation of these species' remaining populations by the TTW also poses reproduction problems, resulting in reduced fertility. Isolation and low population density decreases the likelihood of successful reproduction since these species depend upon water currents for fertilization. Because these clams feed by filtering water, they are also affected by runoff of fertilizers, pesticides, and other pollutants.

All five species may also be adversely affected by loss of their fish hosts, certain species of fish to which mussels in early stages of development attach themselves for dispersal. Although the host fish for these particular species have not been identified, the hosts of clams from riffle habitats tend to be riffle-dwelling species that are also likely to decline or become extirpated as the habitat is modified.

Designations of Critical Habitat for the five Tombigbee mussels were found to be imprudent and of no additional benefit in this case. Federal regulations for alterations of the mollusks' habitats are primarily the responsibility of the U.S. Army Corps of Engineers (COE), and that agency is aware of the location



penitent mussel

of the remaining populations of the five species. In addition, the threat from taking of these rare species could increase with the required publication of Critical Habitat maps that accompany such a designation.

Benefits of Listing

If the proposal to list these five clams is approved, they will receive all the benefits and protection authorized by the Endangered Species Act. These measures include recognition of their precarious status, possible Federal funding to State programs for their conservation, the development of plans for their recovery, and prohibitions against certain practices.

Although a formal Critical Habitat designation is not being proposed at this time, Section 7 of the Act requires Federal agencies to ensure that any actions they authorize, fund, or carry out are not

likely to jeopardize the survival of any listed species. Federal activities that could be affected by this proposed listing include COE projects for flood control and navigation, and Soil Conservation Service (Department of Agriculture) watershed projects on Tombigbee River tributaries. If this proposed rule is made final, Federal agencies would be required to consult with the FWS on any of their activities that may affect the species. However, it has been the experience of the FWS that nearly all Section 7 interagency consultations are resolved so that the species are conserved while project objectives are met.

Comments on this listing proposal are welcome and should be sent by June 6, 1986, to the Endangered Species Field Supervisor, U.S. Fish and Wildlife Service, Jackson Mall Office Center, Suite 316, 300 Woodrow Wilson Avenue, Jackson, Mississippi 39213.

Three Species Given Federal Protection

The following species were recently added to the U.S. List of Endangered and Threatened Wildlife and Plants:

Tumamoca macdougallii (Tumamoc Globe-berry)

On April 29, 1986, the FWS published a final rule in the *Federal Register* to list the Tumamoc globe-berry as Endangered. First collected in 1908 on Tumamoc Hill, west of Tucson, Arizona, this monotypic species is a delicate perennial vine belonging to the gourd family (Cucurbitaceae). It grows from a tuber-

ous root, has herbaceous stems, and bears small, yellow flowers that produce tiny, red, watermelon-like fruits.

Historically, *T. macdougallii* was found at 16 widely scattered locations from Pima County, Arizona, to northern Sonora, Mexico. Much of this former range is being modified by agricultural and urban development. Today, there are 30 known U.S. populations containing approximately 433 adult plants and 1,867 juveniles; in Mexico, about 60 plants remain. Although the juvenile individuals are significant to the total population number, *T. macdougallii* has a high rate of seedling mortality.

Seventy-five percent of the entire population of this species in the U.S. is located on non-Federal land (city, county, State, and privately owned), and there is a good possibility that modification of the globe-berry's habitat could occur, resulting in destruction or damage to the plants. In addition, the State of Arizona is trying to secure parcels of BLM-administered land in the Avra Valley, some of which contain populations of *T. macdougallii*. If this land is transferred to State jurisdiction, it is expected to undergo development. Other threats to the species include the proposed construc-

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tion route of the Central Arizona Project aqueduct (a Bureau of Reclamation (BR) water diversion project), grazing, and collecting. The FWS will work with the BR to minimize impacts to *T. macdougalli* from the aqueduct.

***Hibiscadelphus distans* (Kaua'i Hau Kuahiwi)**

Also listed as Endangered in April (F.R. 4/29/86), *Hibiscadelphus distans* is a small tree that grows up to 18 feet (5.5 meters) tall. This member of the mallow family (Malvaceae) has green, heart-shaped leaves, smooth bark, and greenish-yellow flowers that turn maroon with age. Only 10 individuals of this rare Hawaiian species remain in the wild, located in the State-owned Pu'u Ka Pele Forest Reserve on the island of Kaua'i. The plants live within an area of approximately 220 square yards (185 square meters) on a steep rock bluff.

Although only discovered in 1972, *H. distans* was probably more abundant and more widely distributed at one time, but browsing by a large feral goat population, maintained by the State for hunting, led to the species' decline. These goats still pose a threat to the remaining plants, along with competition with other exotic species, disturbance from hikers, collecting, and vandalism. Removal of or damage to any of the few remaining individuals could seriously jeopardize this species' chances for survival. Although *H. distans* is found within a State forest preserve where regulations prohibit the removal or destruction of the plants, these regulations are difficult to enforce. The Endangered Species Act will now provide additional protection.

***Gila dilaenia* (Sonora Chub)**

This fish, a member of the minnow family, generally is less than 5 inches (125 millimeters) in total length, moderately chubby, and dark-colored. It is primarily a pool dweller, but not much more is known about its behavior and habitat preferences. Because of the threats to its existence by the introduction of exotic fishes into its habitat and by potential mining activities, the FWS listed the Sonora chub as Threatened on April 30.

The Sonora chub is located in Santa Cruz County, Arizona, and in Sonora, Mexico. The U.S. population occurs in the Coronado National Forest's Yank's Spring, Sycamore Creek, and in two of its tributaries: Penasco Creek and an unnamed stream. During years of heavy rainfall, water reaches to the International Border, some 5 miles (8 km) downstream from Yank's Spring, at which time the Sonora chub extends its range to that boundary. In Mexico, this species is known from very few localities and its biological status there is uncertain. Such

a limited distribution makes the Sonora chub very susceptible to any habitat disturbances, especially during periods of intermittent stream flow. Increased siltation and runoff subsequent to mining or other activities, depletion of stream flow, and the introduction of manmade pollutants into the stream could quite possibly extirpate the species throughout its U.S. range in a relatively short time.

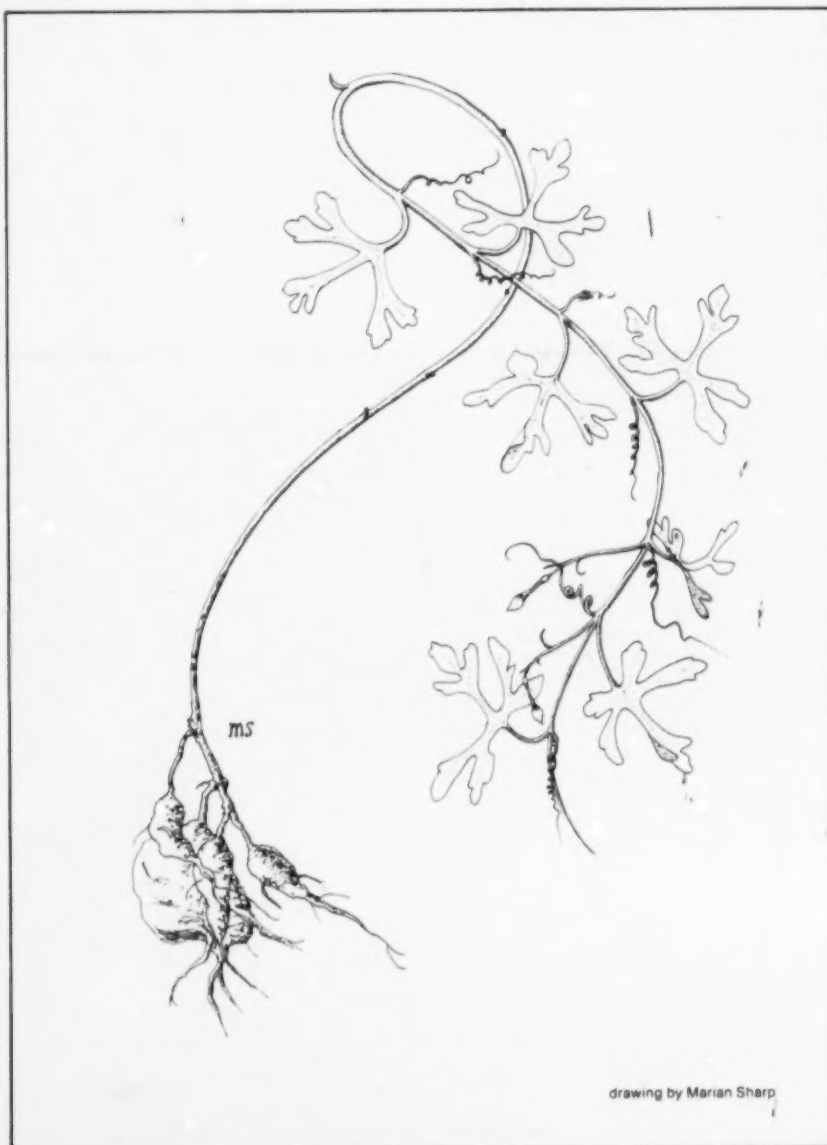
As part of the final rule, Critical Habitat was designated for the Sonora chub to include the entire area in the U.S. where the species is known to occur, as well as a 25-foot (7.6 m) wide riparian zone along each side of the streams. This Critical Habitat area is under the jurisdiction of the U.S. Forest Service, whose management is currently compatible with the designation.

Available Conservation Measures

Each of these three species now receives the full protection authorized by the Endangered Species Act. Conservation measures available under the Act include a requirement for the FWS to develop and implement a recovery plan for each species, possible Federal funding for State conservation programs, and prohibitions against certain practices.

Under Section 7 of the Act, Federal agencies are required to ensure that any actions they authorize, fund, or carry out are not likely to jeopardize the survival of any listed species or adversely modify its Critical Habitat. Although the Sonora chub and the Tumamoc globe-berry are

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Tumamoca macdougalli

Three Plants

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located within federally-administered lands, the Federal agencies involved (U.S. Forest Service, Bureau of Indian Affairs, Bureau of Land Management, and Bureau of Reclamation) are aware of the species' presence on their lands and are actively planning their activities to minimize adverse effects to these newly listed species. These Section 7 provisions apply to all listed species even though Critical Habitat is not always formally designated.

Interstate and international trafficking in listed species without a permit is also prohibited, with certain exceptions. Due to the numerous threats to *Hibiscadelphus distans* and its depleted state in the wild, it may be necessary to propagate the species in nurseries; permits could be obtained under such circumstances. Several specimens are in cultivation, and seeds have been sent to Texas A & M University.

Under Section 9, the take of listed animals without a Federal permit is generally prohibited, but since the Sonora

chub is threatened primarily by habitat disturbance or alteration rather than direct taking, a special rule allowing take for special purposes was issued as part of the final rule for the chub. Take may occur for educational, scientific, and other conservation purposes compatible with the Endangered Species Act without the need for a Federal permit, if a State collection permit is obtained and all other State wildlife conservation laws are satisfied. For listed plants, the rule on take is different; it is a violation of the Act to remove Endangered plants only from lands under Federal jurisdiction.

Eighteen Plants

(continued from page 1)

Lake Wales Ridge in Polk County, nine are in Highlands County, and the rest are in Lake and Osceola Counties. Only the plants in Highlands Hammock State Park are currently protected from habitat loss.

•***Eryngium cuneifolium* (snakeroot)**—A member of the parsley family (Apiaceae), this species is an erect perennial herb with a long, woody taproot. There usually are several branching stems reaching up to 1.5 feet (0.5 m) in height. The species' small flowers, which turn gradually from greenish-white to powder blue, appear from August to October. *E. cuneifolium* has a narrow geographical distribution of 11 known localities in Highlands County, one in Putnam County, and another in Collier County. Only the colonies on Archbold Biological Station, a privately owned facility in Highlands County, receive protection from habitat destruction.

•***Hypericum cumulicola* (Highlands scrub hypericum)**—This wiry perennial, a member of the St. John's-wort family (Hypericaceae), sends out several erect stems about 2 feet (0.6 m) tall from a taproot. The stems bear widely spaced pairs of small, needle-like leaves. Numerous small, bright yellow flowers begin to appear in June. *H. cumulicola* is known historically from 36 sites, but its presence is now confirmed at only 11 in southern Highlands County. All but three of these localities, those on the Archbold Station and on The Nature Conservancy's (TNC) Lake Arbuckle preserve, are vulnerable to development.

•***Paronychia chartacea* (papery whitlow-wort)**—This small annual in the pink family (Caryophyllaceae) forms bright green, low growing mats of vegetation up to 4 inches (10 centimeters) thick, radiating from a taproot. Among its distinguishing features are its stems that fork repeatedly from the base, its tiny scale-like



drawing by Anna-Lisa King

Eryngium cuneifolium

leaves, and the numerous small white flowers. *P. chartacea* has a somewhat larger geographical range than the other recently proposed Florida scrub plants, and is known from 46 sites, some of which are on the Archbold Station and the Lake Arbuckle preserve.

•***Polygonella basiramia* (wireweed)**—Another taprooted annual, this member of the buckwheat family (Polygonaceae) forms clusters of 7 to more than 30 erect, slender branches that reach a height of approximately 2.5 feet (0.8 m) and bear small, hairlike leaves. *P. basiramia* is conspicuous only in fall when the short clusters of small white flowers appear. Some protected sites exist on the Archbold Station and on Highlands Hammock State Park, but the total number of localities is small, only 21.

•***Warea carteri* (Carter's mustard)**—This member of the mustard family (Brassicaceae) is an unbranched annual up to 3 feet (1 m) tall. Its simple, alternate leaves gradually diminish in size upward along the stem until they become small bracts near the apex. The stem is topped by a raceme of white flowers. Historically, *W. carteri* was reported from Dade, Brevard, Polk, Highlands, and (possibly) Liberty Counties, but recent surveys indicate that it survives at only a single site on the Archbold Station.

All of the above species are proposed for listing as Endangered, with the exception of *Paronychia chartacea*. Because this species occurs at more sites than the others and is not in imminent danger of extinction, although its habitat is vulnerable, *P. chartacea* has been proposed for listing as Threatened.

Sand pine scrub vegetation consists of sand pine (*Pinus clausa*) with shrubby evergreen oaks (*Quercus* spp.). It is restricted to Florida, where it is widespread, and to the Alabama Gulf Coast. This is one of the most distinctive natural communities of Florida, both on the coasts and on inland sand ridges, and it

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is the primary (sometimes only) habitat for a number of plants and animals, some of which are already listed or are candidates for listing.

The main threat to the Florida scrub plants is the widespread loss of habitat. Many interior areas have been converted from sand pine scrub to citrus groves. Florida has a very rapidly expanding human population, and residential developments also are replacing large areas of natural habitat. Many of the remaining stands of scrub are only small, isolated fragments.

Conservation of the sand pine scrub plant community requires periodic disturbance. The recently proposed plants grow only on patches of bare sand within the scrub areas. Scrub burns infrequently, roughly every 30 to 80 years, but the fires can be intense. Most of the shrubs renew themselves from root sprouts, although sand pine and rosemary (*Ceratiola ericoides*) reoccupy burned areas only by seed. Occasional fires or brush removal are needed to maintain the otherwise ephemeral open habitat. Total suppression of wildfires, therefore, can modify the habitat by allowing brushy encroachment.

Several of the newly proposed Florida scrub plants grow on lands managed for conservation purposes, but these areas do not contain all of the endemic scrub species and may not have sufficient

populations of the proposed species to ensure their survival. The Archbold Biological Station expects to employ prescribed burning as a habitat management technique, and TNC may follow suit. Listing the Florida scrub plants could encourage vegetation management in other areas as well.

All currently known sites for the recently proposed scrub-endemic plants are on private or State-owned lands not affected by Federal activities, with a few exceptions. For example, some of the plants that occur on State highway rights-of-way may be subject to Federal involvement if the Federal Highway Administration provides funds for road maintenance and construction. If the scrub plants are listed and Federal agencies determine that their actions may affect any of the species, the agencies involved will be required to consult with the FWS.

Comments on the April 24, 1986, proposal to list the scrub lupine are welcome from all interested agencies, organizations, and individuals, and should be sent to the Field Supervisor, Jacksonville Endangered Species Field Station, U.S. Fish and Wildlife Service, 2747 Art Museum Drive, Jacksonville, Florida 32207 by June 23, 1986. Comments on the April 10 proposal to list seven other Florida scrub plants are due June 9, 1986, at the same address.

Two Puerto Rico Plants

Peperomia wheeleri (Wheeler's peperomia), a fleshy evergreen herb in the pepper family (Piperaceae), was proposed for listing as Endangered on April 10. This species grows to about 3 feet (1 m) in height and bears clusters of minute flowers in spikes 4 to 6 inches (10 to 15 cm) long. It is restricted to an area of semievergreen, open forests on large boulders on the north slopes of Monte Resaca on Culebra Island, part of the Commonwealth of Puerto Rico. Although the boulder substrate extends over much of the north side of Culebra Island, deforestation and livestock grazing have eliminated or substantially altered the native vegetation, thus removing *P. wheeleri* from most of its former range. Within the remaining forested areas, foraging by escaped domestic fowl is destroying the layer of humus overlying the boulders that is needed by the plant.

Almost all of the surviving *P. wheeleri* populations are located within the 375-acre (152-hectare) Monte Resaca Unit of Culebra National Wildlife Refuge. Measures are being taken on the refuge to exclude livestock; however, until this work is complete and a habitat management plan for *P. wheeleri* is developed, some additional losses of plants and habitat are likely.

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Peperomia wheeleri

photo by Deborah Mignogno

***Banara vanderbiltii* (Palo de Ramon)**, another Puerto Rico plant proposed for listing as Endangered on April 10, belongs to the flacourtiaceae family (Flacourtiaceae). This evergreen tree can reach up to 30 feet (10 m) in height. The species currently survives at a single locality in the semievergreen forests of the karst region of northern Puerto Rico.

B. vanderbiltii was discovered in 1899 and the first specimens were collected at sites near what is now the greater San Juan metropolitan area; however, the species is now extirpated there due to deforestation. In the 1950's, two trees were discovered in the limestone hills west of the town of Bayamón but they subsequently were destroyed when the area was cleared to plant yams. The species was believed to be extinct until further investigations in the same general region resulted in the discovery of five young plants; a sixth plant also was found recently. These plants occupy a privately-owned site of less than 165 square feet (16 square m) that is less than 660 feet (200 m) from a major highway. Further clearing, modification of the forest edge, or encroachment by exotic plant species could result in the extinction of *B. vanderbiltii*.

Comments on the proposals to list *P. wheeleri* and *B. vanderbiltii* as Endangered are welcome, and should be sent to the Field Supervisor, Caribbean Field Office, U.S. Fish and Wildlife Service, P.O. Box 491, Boquerón, Puerto Rico 00622 by June 9, 1986.

Two California Plants

Two plant taxa endemic to small areas of southern California were proposed for listing as Endangered on April 9. The first, ***Eriastrum densifolium* ssp. *sanctorum*** (Santa Ana River woolly-star), is a shrub in the phlox family (Polemoniaceae) that occasionally grows 3.3 feet (1 m) tall. Its stems and leaves are gray-green in color, and the bright blue flowers are contained in heads of about 20 blossoms each. This subspecies once occurred on the higher floodplain terraces of the Santa Ana River and its tributaries in Orange, Riverside, and San Bernardino Counties, where it was a conspicuous part of the alluvial fan scrub vegetation.

All of the plant's Orange County habitat has been replaced by urbanization, citrus groves, horse stables, and urban parks. In Riverside County, the former sites now contain residential developments, ranches and croplands, and sand and gravel mines. The plant survives only in isolated stands in San Bernardino County along the Santa Ana River, and at a disjunct colony along Lytle Creek. Only remnants of habitat remain; where the river has been channelized,



Eriastrum densifolium ssp. *sanctorum*

urban and agricultural developments have spread down to the river's edge.

***Centrostepha leptoceras* (slender-horned spineflower)** has declined for similar reasons. This small prostrate annual in the buckwheat family formerly was more widespread, occurring on old sandy benches or floodplain terraces containing alluvial fan scrub habitat in Los Angeles, Riverside, and San Bernardino Counties. Currently, however, it is known to exist at only 4 localities total-

ing less than 10 acres (4 hectares) within Riverside and San Bernardino Counties. The colonies are found along the Santa Ana River, Lytle Creek, San Jacinto River, and Temescal Creek.

In addition to habitat loss, this low-growing plant is threatened by the spread of taller, weedy exotic annuals that block the full sun it needs. All known *C. leptoceras* sites are near areas dominated by such introduced plants.

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The remaining stands of *E. d. ssp. sanctorum* and *C. leptoceras* in San Bernardino County are threatened by proposed sand and gravel mines on private and Bureau of Land Management (BLM) lands. Flood-control dams proposed by the U.S. Army Corps of Engineers (COE) in the upper Santa Ana River Canyon and Lytle Creek could indirectly affect the plants if the projects result in the relaxation of zoning restrictions that now limit development in the flood plain. Increased urbanization of the flood plain could lead to extinction of *E. d. ssp. sanctorum* and extirpation of *C. leptoceras* from San Bernardino County. The San Jacinto River and Temescal Creek drainages are also experiencing urban and agricultural development.

The populations of these plants that occur on Federal lands are within the BLM's Metropolitan Project Area of Southern California. BLM is transferring its holdings in this project area to other Federal and private agencies. Some of the habitat conservation benefits available under the Endangered Species Act would be lost if the sites pass from Federal jurisdiction. If the taxa do become listed, the COE, BLM, and any other Federal agency whose activities may affect the plants would be required to consult with the FWS. Further, it would become illegal to collect these plants on lands under Federal jurisdiction except under Federal permit.

Comments on the listing proposal are welcome, and should be sent to the Chief, Division of Endangered Species, U.S. Fish and Wildlife Service, Region 1 (address on page 2 of the BULLETIN), by June 9, 1986.

Geocarpon minimum

G. minimum, the only member of its genus, is a small, succulent annual in the pink family that grows only up to 1.6 inches (4.0 cm) in height. It is ephemeral, usually completing its life cycle within a 4-week period. The plants are a dull gray when young and turn reddish-purple at maturity.

Extensive field surveys of suitable habitat have resulted in the location of only 13 surviving *G. minimum* populations in Missouri and 3 in Arkansas. In Missouri, the species grows on moist, sandy soils of exposed sandstone outcrops primarily of the Channel sands formation. Arkansas sites are sandy-clay prairies within otherwise savanna-type areas that have bare mineral soils of the Lefe Series (high in sodium and magnesium) and that may represent relict Pleistocene lake beds. Species diversity is low in both of these communities.

Of the Missouri sites, there are five in Dade County, two each in Polk, St. Clair,

and Cedar Counties, and one each in Lawrence and Greene Counties; however, only 4 support vigorous populations. In Arkansas, there is a large population at Warren Prairie (in parts of Bradley and Drew Counties) and two small depauperate sites at Kingsley Prairie (Cleveland County). Most of the *G. minimum* sites are on privately-owned lands, although two are on areas administered by the COE, one is on land owned by the State of Missouri (Missouri Department of Conservation), and a portion of another belongs to the State of Arkansas (Arkansas Natural Heritage Commission).

Many of the Missouri sites have been damaged from trampling and grazing by cattle; in fact, grazing is probably responsible for the species' extirpation at its type locality. *G. minimum* habitat continues to be damaged by off-road vehicles (ORVs). Suitable habitat is limited, and most such areas have been heavily damaged.

In Arkansas, many of the sites have been damaged by silvicultural practices. Even though the habitat is of low agricultural quality, some areas also have been cultivated in the past or converted to pasture. *G. minimum* populations near roads may be further threatened by future road expansions and improvements.

Overcrowding and shading from other vegetation constitutes an additional threat to *G. minimum*. It is a pioneer species that tolerates little competition and seems to require some type of natural disturbance of the habitat in order to maintain bare substrate for seedling establishment.

Although *G. minimum* is not in imminent danger of extinction, it is rare and vulnerable, and the FWS proposed on April 10 to list it under the Federal Endangered Species Act as Threatened. It is already listed under Missouri law as endangered, a State classification that prohibits commercial exploitation of the plant without a permit but does not protect against habitat loss on private lands, which is the main threat to *G. minimum*.

Two of the *G. minimum* sites in Dade County are on lands administered by a Federal agency, the COE; however, there are no known current or planned Federal activities that may affect the species. Both populations on federally administered lands will receive Endangered Species Act protection from collectors if *G. minimum* is listed.

Comments on the proposal to list this plant as Threatened are welcome, and should be sent to the Endangered Species Field Station, U.S. Fish & Wildlife Service, Jackson Mall Office Center, Suite 316, 300 Woodrow Wilson Avenue, Jackson, Mississippi 39213 by June 9, 1986.

***Lysimachia asperulaefolia* (Rough-leaved Loosestrife)**

The slender stems of this perennial herb in the primrose family (Primulaceae) grow from a rhizome and can reach heights of up to 2 feet (60 cm), although it typically grows only to about half that size. Whorls of usually three to four leaves encircle the stem at intervals below the plant's showy yellow flowers. *L. asperulaefolia* was reported historically from 2 sites in South Carolina and 17 in North Carolina, but widespread modification and loss of habitat apparently has eliminated the species from South Carolina. It is known to survive

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Lysimachia asperulaefolia

photo by Kerry T. Owens

only at nine sites in North Carolina. Because the remaining populations are vulnerable, the species was proposed for listing as Endangered on April 10.

L. asperulaefolia is endemic to the coastal plain and sandhill regions of the Carolinas. It generally occurs in the ecotones or edges between longleaf pine uplands, savannas, and pond pine pocosins (areas of dense shrub and vine growth, usually on peaty, poorly drained soil). These ecotones are maintained by periodic wildfires, as are the adjacent plant communities. Some of the historical habitat has been greatly modified by fire suppression, which results in the uncontrolled growth of competing shrubby species, eliminating the open edges required by the shade-intolerant *L. asperulaefolia*. Drainage of the moist habitat for conversion to pine plantations or other silvicultural operations also has directly eliminated several populations of the species. To a lesser extent, residential and industrial developments have contributed to the loss of habitat.

Two of the remaining populations of *L. asperulaefolia* are in Carteret County. Both are on lands administered by the U.S. Forest Service (Croatan National Forest); however, one is partially on private land. The largest population is composed of several colonies, two of which have declined and are threatened by continuing draining and other activities related to silviculture on adjacent areas. Another two populations are in Scotland County on Department of Defense (DOD) property that is leased and managed by the North Carolina Wildlife Resources Commission as part of the Sandhills Game Lands. Both are threatened by shrub encroachment due to fire suppression. Of Brunswick County's two *L. asperulaefolia* populations, one is vigorously responding to habitat management by prescribed fires on TNC property. The other, on the DOD Sunny Point Military Ocean Terminal, also has benefited from a recently initiated program of prescribed burning, but nearby drainage of pocosins could affect the hydrology of the site.

A population consisting of two small colonies, which cover a combined area of less than 7.2 square yards (6.0 sq. m) is located on the border of Cumberland and Bladen Counties. One of the colonies is on land owned by the North Carolina Department of Natural Resources and Community Development, and the other is on private property. Both colonies are threatened by fire suppression. In Pender County, an *L. asperulaefolia* population occurs on land owned in part by TNC and the North Carolina Wildlife Resources Commission; a small portion of the tract also is privately owned. This population is small and feeble due to severe brush

encroachment. The ninth surviving population is in Hoke County on Fort Bragg Military Reservation. Although still relatively vigorous, this population is vulnerable to fire suppression or a long-rotation burning schedule, timber harvesting, and (possibly) mechanized military training exercises in the fragile pocosins.

L. asperulaefolia is listed by the State of North Carolina as endangered under its own legislation, which provides for controls on taking and intrastate trade but does not cover adverse habitat modifications. Because most of the remaining populations are at least partially on lands under Federal, State, or TNC ownership, listing the species as Endangered under the Federal Endangered Species Act would encourage the continued use of prescribed burning and other appropriate habitat management techniques. Additionally, it would become illegal to collect plants on Federal lands without a Federal permit.

The U.S. Forest Service and the DOD are the two Federal agencies that have direct jurisdiction over portions of *L. asperulaefolia* habitat. Their potential activities that could affect the species and its habitat in the future include, but are not limited to: timber harvesting and conversion of population sites to pine plantations by means of drainage and mechanical site preparation; mechanized military training activities; recreational developments; drainage operations; road construction; and permits for mineral exploration. No major conflicts are foreseen, however, and the FWS will work with the involved agencies to secure the species' conservation while accommodating agency objectives to the extent possible.

Comments on the proposal to list *L. asperulaefolia* as Endangered are welcome, and should be sent to the Field Supervisor, Asheville Endangered Species Field Station, U.S. Fish and Wildlife Service, 100 Otis Street, Room 224, Asheville, North Carolina 28801 by June 9, 1986.

***Lesquerella pallida* (White Bladderpod)**

An erect to spreading annual in the mustard family, *L. pallida* individuals range from 2.0 to 23.6 inches (5 to 60 cm) tall. The white flowers are arranged in racemes up to 6.3 inches (16 cm) long and containing up to 24 blossoms. This species occurs near the city of San Augustine in the gently rolling coastal plain of eastern Texas. Only three small populations are known, and all are vulnerable to habitat disturbance. Accordingly, *L. pallida* was proposed on April 9 for listing as Endangered.

This species is found in open areas associated with rock outcrops of the

Weches formation, which usually consists of calcareous marine sediments underlain by a grayish-green layer of glauconite. Because of the impermeability of the glauconite layer, Weches outcrops are wet much of the year. Soils around the outcrops are basic in pH due to the high levels of calcium and magnesium in the rocks, in sharp contrast to the acidic, leached soils usually encountered in eastern Texas.

The largest of the three known *L. pallida* populations was discovered in 1981 on privately owned land used for pasture. It covers approximately 5 acres (2 hectares) and, in 1985, probably numbered 3,300 or more individual plants. Both of the other existing populations were found in 1985. One numbers about 30 plants and is confined to a single opening of about 13 by 49 feet (4 by 15 m) on private land near an area used partially as a garbage dump. This site also is being invaded by Macartney rose (*Rosa bracteata*) and other shrubs and trees. The third population is located on a county road right-of-way and an adjacent pasture. It measures approximately 98 by 246 feet (30 by 75 m) in size and contains about 160 plants. Brush encroachment is occurring at this site as well.

Herbicide spraying for brush control in pastures is a common practice in the region. Inadvertent application of herbicides to *L. pallida* could destroy the two smaller populations and seriously reduce the largest one. Although the pastures where the plants occur are now only moderately grazed, future changes in ownership or management could increase the chances that *L. pallida* populations could be seriously damaged by trampling and overgrazing. In addition, the population on the county road right-of-way could be damaged by road widening or roadside maintenance, including spraying.

Comments on the proposal to list *L. pallida* as Endangered are welcome, and should be sent to the Regional Director, Region 2 (address on BULLETIN page 2), by June 9, 1986.

***Lesquerella filiformis* (Missouri Bladder-pod)**

Another annual in the mustard family, *L. filiformis* grows erect, hairy stems that branch from the base and reach a height of approximately 8 inches (20 cm). The basal and stem leaves also are hairy on both sides, giving them the gray-silvery appearance that distinguishes this species from the only other *Lesquerella* in Missouri, the introduced *L. gracilis* var. *gracilis*. *L. filiformis* has light yellow flowers that usually appear at the tops of the stems in late April to early May.

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L. filiformis is endemic to the unglaciated prairie area of southwestern Missouri at nine sites within Greene, Dade, and Christian Counties. The sites are in open glades where soils are shallow and the underlying limestone bedrock approaches or reaches the ground surface. Although *L. filiformis* is not known to have been more widespread historically than it is today, the species' low numbers and limited distribution make it vulnerable to collecting and habitat disturbance. A proposal to list the plant as Endangered was published on April 7.

Two of the nine known populations are within the Wilson's Creek National Battlefield, a unit of the National Park Service, in Christian and Greene Counties. A system of interpretive trails extends through the *L. filiformis* sites, and research is needed to determine proper habitat management in the face of an anticipated rise in future visitor levels. Three populations occur on State highway rights-of-way; two of these also extend onto adjacent private lands. Cooperation with the Missouri Department of Transportation is necessary to protect the plants from the effects of mowing or herbicides. The remaining four populations are on private property and could be vulnerable to future land use changes.

Missouri already lists *L. filiformis* under its own legislation as endangered. State regulations prohibit exportation or sale of the species, and prohibit its collection without landowner permission. Prohibitions against collecting will be reinforced for those populations on the national battlefield if *L. filiformis* is listed under the Federal Endangered Species Act.

Comments on the listing proposal are welcome, and should be sent to the Endangered Species Coordinator, U.S. Fish and Wildlife Service, Federal Building, Fort Snelling, Twin Cities, Minnesota 55111 by June 6, 1986.

***Eriogonum humilvagans* (Spreading Wild-buckwheat)**

This low-growing perennial in the buckwheat family reaches 8 to 12 inches (20 to 30 cm) high and spreads 12 to 16 inches (30 to 40 cm) across. The narrow, strictly basal leaves are densely hairy below and mostly green above. *E. humilvagans* produces branched, spreading inflorescences that bear clusters of tiny white flowers. There is only one extended population, which is broken up into six localized occurrences over a distance of about 10 miles (16 kilometers) in San Juan County, Utah. Much of the species' historical habitat has been lost to agriculture, and some of its remaining range

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Lesquerella filiformis

photo by Sherry Morgan, Missouri Department of Conservation



drawing by K. H. Thorne

Eriogonum humilvagans

is over land leased for possible mining or drilling. Because of its decline and uncertain future, *E. humivagans* was proposed on April 7 for listing as Endangered.

The sub-populations range in size from 100 to 3,000 plants, with a total of approximately 5,000 plants known. They occur on remnant heavy clay soils of the Mancos shale formation in an area of pinyon-juniper woodlands and sagebrush parks. Many of these areas have been cleared and put under nonirrigated, dryland cultivation. Only one *E. humivagans* site is in an undisturbed area. Most of the others occur as small remnants along the edges of cleared fields, sometimes on opposite sides, implying the nearly total loss of larger continuous occurrences. The species' type locality has been bisected by a State highway, and the remaining individuals in the right-of-way could be affected by further con-

struction and certain roadside maintenance practices.

Because the underlying geological formation may contain uranium, gas, or oil, further losses of habitat could result from activities relating to mining or drilling. Several of the *E. humivagans* sites are covered by mining claims and oil or gas leases. Some of the leases have been allowed to expire by one company and then were picked up by another, which indicates low commercial potential. Impacts to the plants are more likely to result from surface disturbance associated with exploration and the annual assessment work that is required to maintain title to the claims.

All *E. humivagans* sites are on private or State lands, except for an isolated 160-acre (65 ha) BLM tract near Monticello. Transferring this habitat from Federal jurisdiction would result in the loss

of some Endangered Species Act benefits, including the prohibition against collecting the plant on Federal land. If the species is listed, BLM will be required to consider the impacts of land disposition as well as to exercise special care in administering leases and claims.

Comments on the listing proposal are welcome, and should be sent to the Endangered Species Staff, U.S. Fish and Wildlife Service, 2078 Administration Building, 1745 West 1700 South, Salt Lake City, Utah 84104 by June 6, 1986.

***Penstemon haydenii* (Blowout Penstemon)**

A stout perennial herb in the snapdragon family (Scrophulariaceae), *P. haydenii* grows leafy stems one to two feet (30.5 to 61.0 cm) in height. Its attractive light-blue flowers are borne on a compact, cylindrical inflorescence, and have a strong, persistent fragrance. Historically, the species probably was widely scattered throughout the central sandhills of Nebraska; however, stabilization of its open sand dune habitat has reduced *P. haydenii* to small populations in Hooker, Cherry, and Garden Counties of 60, 230, and 660 individuals, respectively. Because its remaining limited range is vulnerable to modification, *P. haydenii* was proposed for listing as Endangered on April 29.

Blowouts themselves are interesting phenomena. These products of natural erosion are peculiar conical or irregular craters scooped out of the deep, loose sands of dune complexes by swirling wind action. *P. haydenii*, having adapted to the unusual environmental extremes of wind, temperature, evapotranspiration, and soil moisture characteristic of blowouts, is found only at such sites. *P. haydenii* can spread by rhizomes, surviving burial in accumulating sand by sending off shoots at progressively higher stem nodes. If the blowouts become stabilized and revegetated by other plants, *P. haydenii* cannot compete. In the past, new blowouts formed as others disappeared; however, widespread control of unstable dunes as a range-management practice has significantly reduced existing blowout habitat and the conditions that lead to their formation.

Approximately 75 percent of the known *P. haydenii* populations occur on the Valentine and Crescent Lake NWRs, managed by the FWS. If the species is listed, the individuals on these Federal lands will receive legal protection from collectors. The other 25 percent are on State and private lands.

Comments on the proposal to list *P. haydenii* as endangered are welcome, and should be sent to the Regional



drawing by Bellamy Parks

Penstemon haydenii

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Director, Region 6 (address on BULLETIN page 2), by June 30, 1986.

Available Conservation Measures

If the listing proposals are later made final, these plants will receive the conservation benefits authorized for Endangered or Threatened plants under the Endangered Species Act. Such benefits include, but are not limited to, prohibitions on interstate or international trafficking in listed plants without a permit; a requirement for the FWS to develop and implement recovery plans; and the possibility of Federal aid to States that

have approved Endangered Species Cooperative Agreements with the FWS for listed plants.

It was judged imprudent to propose designations of Critical Habitat for these plants. Publishing the maps and detailed habitat descriptions required for such designations could further threaten these species by making them more accessible to illegal collectors, who may find the plants desirable for their attractiveness or rarity. Nevertheless, if these species are listed, they and their habitat will receive protection under Section 7 of the Act, which requires Federal agencies to ensure that any actions they fund, authorize, or carry out are not likely to jeop-

ardize the survival of listed species. When a Federal agency finds that one of its actions may affect a listed species, that agency must consult with the FWS. With early planning and consultation, potential conflicts with project goals almost always can be avoided.

Section 9 of the Act makes it illegal to remove and reduce to possession Endangered or Threatened plants from lands under Federal jurisdiction. This complements any controls on taking that may exist under State law. Federal collecting permits are available for approved research or conservation purposes when consistent with applicable State and other Federal regulations.

Regional Briefs

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Team members were each assigned to review specific portions of the recently completed technical draft of the Yaqui Fishes Recovery Plan. A key component of the recovery of the Rio Yaqui species involves combining the master plan for the San Bernardino National Wildlife Refuge (NWR) with the Yaqui fishes recovery effort.

Potential recovery actions for the recently listed Sonora chub (*Gila ditaenia*) also were discussed. Discussions were held regarding the possible use of aquatic habitats on the Buenos Aires NWR as refuge and grow-out areas for certain desert fish species, including the desert pupfish (*Cyprinodon macularis*), bonytail chub (*Gila elegans*), Colorado squawfish (*Ptychocheilus lucius*), razorback sucker (*Xyrauchen texanus*), and Gila topminnow (*Poeciliopsis occidentalis*). Recent surveys on the refuge sampled 47 ponds and found only four introduced fish species (yellow and black bullhead, fathead minnow, and mosquitofish). After the meeting, the team visited selected Endangered fish habitats in Arizona, including Monkey Springs, Bog Hole, Sharp Spring, and San Bernardino NWR.

On April 3, a public hearing was held in Ballinger, Texas, concerning the listing of the Concho water snake (*Nerodia harteri paucimaculata*) as a Threatened species with Critical Habitat. (See story on proposed rule in BULLETIN Vol. XI No. 2.) Over 325 people attended the meeting, with the majority expressing concern about how the listing might affect the proposed Stacy Dam on the Colorado River. Numerous officials from cities in the area presented information about the need for water from Stacy Dam and the economic impact that might

result from a Critical Habitat designation. No new biological data were presented.

The FWS recently received status reports on two species of nectar-feeding bats, *Leptonycteris sanborni* and *L. nivalis*. Surveys of sites in the U.S. and Mexico indicate that both species have declined in recent years. For example, the population of *L. nivalis* in the Big Bend area of Texas, the only major U.S. roosting site for the species, was estimated to contain 10,650 bats in 1967. Only 1,000 bats were estimated to exist in 1983. The major U.S. roosting colony for *L. sanborni* is on private land in Santa Cruz County, Arizona. Until the 1950's, a roosting colony for this bat contained as many as 20,000 females; that colony no longer exists.

U.S. and Mexican populations of these species migrate south in the fall. Their survival is threatened by disturbances of roost sites, loss of food sources (flowers of certain agave and cacti), and killing by humans. Both species are currently considered Category 2 candidates for future listing proposals.

There are 16 active bald eagle (*Haliaeetus leucocephalus*) nests in Arizona this year. Eleven of those nests are still viable, and up to 16 young may fledge this spring. In March, one nest with two 10-day-old chicks was jeopardized by rising water levels in Horseshoe Reservoir. The chicks were rescued by personnel from the FWS, Bureau of Reclamation, and Salt River Project and taken to the Phoenix Zoo. The zoo personnel cared for the chicks using bald eagle puppets for 5 days and then fostered them into another nest where hatching was 2 weeks overdue. The adult bald eagles adopted the new chicks and began feeding them immediately. As of

May 1, they were doing well and were expected to fledge in late May.

This year, the FWS is planning to release 2,000 masked bobwhite (*Colinus virginianus ridgwayi*) chicks onto the Buenos Aires NWR in southern Arizona between July and October. These chicks, hatched at the Patuxent Wildlife Research Center in Maryland, will be foster-parented by 257 sterilized male Texas bobwhites (*C. v. texanum*). A draft of the refuge master plan will be available for public comment by late summer or fall.

Region 3—A meeting on rare plants was held April 1-3 at the Missouri Botanical Garden in St. Louis. In attendance were representatives from the Region 3 and Washington Offices of Endangered Species, FWS Wildlife Permit Office, FWS Division of Research, FWS Regions 4, 5, and 6, National Park Service, The Nature Conservancy, State conservation agencies in Region 3, and several arboreta people and botany graduate students. The main objective of the meeting was to rank candidate plants found in the region for future listing and recovery actions. Other topics of discussion centered around reports on rare plant protection activities and concerns associated with the introduction of cultivated plants back into the wild.

On April 12, more than 3,500 people visited the Missouri Botanical Garden to participate in Missouri's Endangered Species Awareness Day. Presentations on various endangered animals and plants were held throughout the day, and there was a display center where many conservation organizations had set up booths. The event was a great success.

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Regional Briefs

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A workshop entitled "Die-offs of Fresh-water Mussels in the United States" will be held June 23-25, 1986, in Davenport, Iowa. The workshop will be co-sponsored by the Fish and Wildlife Service and the Upper Mississippi River Conservation Committee. For further information, contact Dr. Richard Neves, Cooperative Fish and Wildlife Research Unit, Virginia Polytechnic and State University, Blacksburg, Virginia 24061; telephone 703/961-5927.

The Peregrine Fund's Boise, Idaho, facility is experiencing heavy embryonic mortality this year. Instead of the 40-60 peregrine falcon (*Falco peregrinus*) chicks that were expected for reintroduction, the number will be closer to 20. The cause of mortality is currently unknown.

Region 4—Mr. Wayne Dubuc, a private citizen of Morgan City, Louisiana, has provided the FWS with data that indicates the number of nesting bald eagles in Louisiana is continuing to increase. In 1974, five active territories were known with three successful nests producing four young. By 1980, there were 14 active territories with 12 successful nests producing 17 young. This year, 29 active territories with 23 successful nests produced 34 young. Some of the results may be attributed to improved surveys; however, the bulk of the increase is from new nest territories established as the lingering effects of the organochlorine pesticide era subside.

In the piedmont region of North Carolina, the Wilmington District U.S. Army Corps of Engineers is preparing to initiate a detailed study of bald eagle roost sites. Eagles began congregating on recently completed Corps reservoirs in 1984; numbers reached 42 in the summer of 1985. The information from the study, part of an ongoing Endangered Species Act (ESA) Section 7 consultation with the FWS, is necessary to evaluate proposed development of these lakes for public recreation.

On August 30, 1985, Hurricane Elena caused considerable damage to Alabama beach mouse (*Peromyscus polionotus ammobates*) Critical Habitat Zone #1. This zone, near the tip of the Fort Morgan peninsula, experienced high winds in excess of 100 knots and a storm surge over 8 feet. As a result, approximately 75 percent of the primary dunes were destroyed by wind and water erosion.

In January 1986, Bon Secour NWR purchased 800 hay bales for a dune restoration project. Through a combined

effort, FWS Jackson, Mississippi, Endangered Species Field Station and Bon Secour NWR personnel placed the hay bales where blow-outs had occurred in the primary dune line. An additional line of hay bales was placed seaward of the primary dunes to reestablish fore dunes, which function as an additional buffer from storms. Sand deposits began immediately, and within two weeks, drifts began to form. Now, the fore dune is over 50 percent reestablished and ready for vegetative plantings. Dune formation in the primary dunes is also progressing rapidly.

In March, FWS and Florida Game and Fresh Water Fish Commission personnel met with representatives of the Florida Department of Transportation to discuss the upgrading of U.S. Highway 1 in the Florida Keys. Two more adult American crocodiles (*Crocodylus acutus*) have recently been killed by automobiles along this heavily travelled highway. Proposed improvements for crocodile protection include the installation of bridges where crocodiles have traditionally crossed the road. Where bridges are not used, box culverts should be installed to allow crocodiles safe passage. Further, it was recommended that road widths be minimized to protect wetlands and that shoulder slopes be as steep as possible to discourage crocodile access. Lastly, it was recommended that guardrails, designed to exclude crocodiles from the roadway, be installed. To protect the Endangered key deer (*Odocoileus virginianus clavium*), it was suggested that rubble strips, flashing lights, reduced speed limits, additional signs, and speed bumps be employed to slow traffic through key deer habitat.

The U.S. Army Corps of Engineers submitted a management plan to the FWS for the deltoid spurge (*Euphorbia deltoidea* ssp. *deltoidea*), an Endangered plant, on U.S. Army property near Miami, Florida. A significant pine rockland forest, a habitat type that supports five federally protected species and several plant and animal listing candidates, is located on the property that is to be used as a reserve training facility.

The Army's management plan proposes to protect the deltoid spurge by restricting use of the pinelands to foot traffic, by providing prescribed burning, and by monitoring population changes in the plant. This plant is endangered throughout its range by conversion of pine rocklands for commercial and residential development. The FWS will provide a biological opinion on the proposed management plan to the Army, as required by Section 7 of the ESA.

The National Park Service (NPS) has entered into an agreement with the North Carolina Department of Agriculture to develop a training program under the Department's Plant Protection Program for NPS employees on identification and management of rare plant species on NPS land along the Blue Ridge Parkway. The mountainous area of western North Carolina is floristically diverse and supports many Federal listing candidate species, as well as several species which are both federally and State listed as Endangered or Threatened.

Two hundred people attended a public hearing held in Lake Waccamaw, North Carolina, regarding the proposed listing of the Waccamaw silverside as a Threatened species. (See story on proposed rule in BULLETIN Vol. X No. 12.) This small fish, endemic to Lake Waccamaw, is a short-lived species that is sensitive to water quality degradation.

Status surveys of four Category-2 plant listing candidates have been completed by the North Carolina Department of Agriculture's Plant Protection Program, under contract with the FWS. Two of these species, *Eupatorium resinosum* and *Calamovilfa brevifolia*, are native to the coastal plain of the Carolinas and Virginia and the pine barrens of New Jersey. The other two, *Hexastylis lewisii* (North Carolina and Virginia) and *Arenaria alabamensis* (North Carolina, South Carolina, and Alabama) are native to the piedmont region. The status survey information will be evaluated further before decisions on Federal listing proposals are made.

The feasibility of establishing an inter-agency Florida Panther Advisory Council, similar to the one established for the grizzly bear (*Ursus arctos horribilis*), was discussed at a workshop held at Everglades National Park in February. Staff from State and Federal agencies distributed a draft memorandum of understanding, and agency heads were asked to consider the initiative and provide their comments at a later date. The FWS also presented the first draft of the revised Florida Panther (*Felis concolor coryi*) Recovery Plan, which should be completed by the end of fiscal year 1986.

Region 5—Translocated Alaskan bald eagles comprise at least 50 percent of the two new pairs of adult birds on territory in the State of New York this spring. One pair, consisting of at least one Alaskan eagle, is nesting at Iroquois NWR, 7 miles west of the 1982 release site. The birds are incubating, and hatching is expected about mid-May. The other pair, a 1982 Alaskan eagle and the 1978 bird from the Patuxent Wildlife Research Center's captive breeding program, has

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been keeping company at Montezuma NWR. This pair is not nesting yet, but the pair bond is forged.

Region 6—Plans are progressing for construction of the black-footed ferret (*Mustela nigripes*) captive breeding facility at the Wyoming Game and Fish Department's (WGFD) Sybille Research Unit near Wheatland, Wyoming. The WGFD is currently soliciting comments from the public as required for an environmental assessment of the site before construction can begin.

This year's attempt to breed captive ferrets does not appear to have been successful. One female black-footed ferret was successfully bred, but pregnancy did not occur. Pairing of captive ferrets continued through April.

The Captive Breeding Specialist Group, chaired by Dr. Ulysses S. Seal, met with the WGFD in Laramie, Wyoming, on April 5 and 6. The purpose of the meeting was to discuss current attempts to breed the captive animals, to identify research needed to better ensure success of captive breeding, to discuss strategies for locating additional ferrets, and to plan for a workshop in August to discuss the reproductive physiology of mustelids.

A National Audubon Society television presentation, "The Mysterious Black-footed Ferret," is currently scheduled for airing on WTBS (cable Channel 17) on June 5 at 9:05 p.m., Eastern Standard Time. This film was produced by Ray Paunovich of Natural Image Films, Worland, Wyoming. He worked closely with the WGFD while photographing this rare mammal in its natural habitat near Meeteetse, Wyoming.

As of April 21, there were nine confirmed sightings of migrating whooping cranes: one in Oklahoma, one in Kansas, five in Nebraska, one in North Dakota, and one in Texas. These sightings cover the period from March 4 through April 21. As of April 17, five birds remained at Aransas NWR. Migrating whoopers are not expected to be seen much later than May 1.

Region 7—The first phase of a study to test the feasibility of using the toxicant Compound 1080 for removing introduced Arctic foxes (*Alopex lagopus*) from selected Aleutian Islands is now complete. These foxes have depleted many avian populations, including the Endangered Aleutian Canada goose (*Branta canadensis leucopareia*).

Approximately 49,000 single-lethal-dose baits were placed on Kiska Island in late March and early April. Of the 185 fox carcasses subsequently found, 132 were buried on site. Rough terrain prevented the retrieval and burial of the remaining carcasses.

Four glaucous-winged gulls and a sea lion pup were also found dead. Although the causes of death are unknown, the sea lion is believed to have been a stillbirth. The gulls and sea lion carcasses and tissue samples from 66 of the dead foxes were collected, and have been sent to the Denver Wildlife Research Laboratory where they will be tested for the presence of Compound 1080.

Population surveys of foxes and non-target species were completed on Kiska before Compound 1080 baits were dispersed. To assess the overall effects of the effort, biologists will return to the island in June 1986 to continue the intensive surveys initiated in June 1985.

Region 8 (Research)—The only known wild California condor (*Gymnogyps californianus*) pair laid their second egg of the year on or about April 13. On April 15, Condor Research Center (Ventura, California) personnel removed the egg from the nest (as they had with fragments of the first egg) and transported it by helicopter to the San Diego Zoo for incubation. The egg is of normal shape, size, and shell thickness, and is fertile. Researchers hope the pair will recycle to produce a third egg.

Two additional California condors, both male, were captured from the wild by Condor Research Center personnel. One bird, the only wild one not genetically represented in the captive flocks, was captured on April 21 at Tejon Ranch and taken to the Los Angeles Zoo. The other was captured on April 22 at Hudson Ranch, where its radio transmitter was replaced, blood sampled for lead (low levels of lead were found), and released.

The California sea otter (*Enhydra lutris nereis*) population was surveyed by FWS and California Department of Fish and Game biologists in late January and early February. Survey conditions were generally good to excellent, and resulted in counts of 1,231 independent otters and 181 dependent pups for a total of 1,412. This is the eighth in a series of counts that began in 1982.

The technique used involves surveying as much of the range as possible from land-based observation points with the aid of high-powered telescopes. Areas that cannot be counted from shore are surveyed from an airplane. Numbers obtained since this method was initiated have been remarkably consistent, varying only about 5 percent. Service biologists believe that the technique has excellent potential for detecting changes in the California population of sea otters. Results obtained thus far, when compared with previous counts, indicate no trends in growth of the population since the early-to mid-1970's.

Recovery Plan Update

The following recovery plans were approved on April 14, 1986, by the FWS: *Nichol's Turk's Head Cactus Recovery Plan*; *Siler Pincushion Cactus Recovery Plan*; and *Chihuahua Chub Recovery Plan*.

Copies of recovery plans become available for purchase about 6 months from their date of approval. Requests for copies should be made to the Fish and Wildlife Reference Service, 6011 Executive Boulevard, Rockville, Maryland 20852; telephone (toll-free) 800/582-3421.

Ivory-bill Rediscovered

Dr. Lester Short of the American Museum of Natural History, along with seven other individuals, recently reported the rediscovery of the Cuban subspecies of the ivory-billed woodpecker (*Campephilus principalis bairdii*) in Cuba. They found two birds (possibly three) with enough available habitat to support a few more. The FWS is in the process of determining the status of the U.S. subspecies.

U.S. CITES Annual Reports Available

By Jeffrey P. Jorgenson
Federal Wildlife Permit Office

The Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), a treaty ratified by 89 countries (including the United States), regulates international trade in certain taxa in order to ensure their survival in the wild. Each member of CITES is required to compile an annual report that summarizes its international trade in CITES-regulated species. The purpose of this report is two-fold: 1) to monitor world trade in CITES-regulated plants and wildlife and 2) to assess the extent to which CITES is being implemented by the member countries.

The Federal Wildlife Permit Office, on behalf of the United States, has compiled U.S. annual reports since 1977. The reports identify the species in trade, the form of the specimen or products, the countries involved (countries of origin, reexport, or import), the source (wild, artificially propagated, or captive)

(continued on next page)

CITES

(continued from page 15)

bred), and disposition of the shipment (cleared, seized, or refused entry). These reports, and those of the other members, are reviewed annually by the CITES Secretariat in Switzerland and the Wildlife Trade Monitoring Unit (an element of the International Union for the Conservation of Nature and Natural Resources) located in the United Kingdom. Discrepancies are called to the attention of the countries involved. Frequently, the U.S. report includes trade not reported by other countries.

These data also are reviewed by scientists and compared to population data in order to determine if species merit further regulation or if other actions are necessary. For example, at the last CITES meeting in Buenos Aires, Argentina, member countries adopted stricter controls for 7 taxa and reduced or removed controls for 22 taxa.

Copies of U.S. annual reports are available from the National Technical Information Service (address below). More specific details on U.S. and foreign trade may be obtained from the Federal Wildlife Permit Office (FWPO/MOB), 1000 N. Glebe Road, Room 611, Arlington, Virginia 22201 (telephone: 703/235-2418).

U.S. CITES Annual Reports

1977 Report No. PB 84 146133
\$11.50 - printed (A05)
\$ 4.50 - microfiche (A01)

1978 Report No. PB 84 146141
\$14.50 - printed (A10)
\$ 4.50 - microfiche (A01)

BOX SCORE OF LISTINGS/RECOVERY PLANS

Category	ENDANGERED			THREATENED			SPECIES* TOTAL	SPECIES HAVING PLANS
	U.S. Only	U.S. & Foreign	Foreign Only	U.S. Only	U.S. & Foreign	Foreign Only		
Mammals	25	20	234	4	0	22	305	23
Birds	60	15	141	3	2	0	221	54
Reptiles	8	6	60	8	4	13	99	21
Amphibians	5	0	8	3	0	0	16	6
Fishes	39	4	11	21	4	0	79	40
Snails	3	0	1	5	0	0	9	7
Clams	23	0	2	0	0	0	25	21
Crustaceans	3	0	0	1	0	0	4	1
Insects	8	0	0	5	0	0	13	12
Plants	93	6	1	23	3	2	128	46
TOTAL	267	51	458	73	13	37	899	231**

* Separate populations of a species, listed both as Endangered and Threatened, are tallied twice. Species which are thus accounted for are the gray wolf, bald eagle, American alligator, green sea turtle, Olive ridley sea turtle, leopard, and piping plover.

** More than one species may be covered by some plans, and a few species have more than one plan covering different parts of their ranges.

Number of Recovery Plans approved: 197

Number of species currently proposed for listing: 29 animals
45 plants

Number of Species with Critical Habitats determined: 96

Number of Cooperative Agreements signed with States: 47 fish & wildlife
26 plants

May 6, 1986

1979 Report No. PB 82 128646
\$19.00 - printed (A10)
\$ 4.50 - microfiche (A01)

1980 Report No. PB 83 143198
\$22.00 - printed (A12)
\$ 4.50 - microfiche (A01)

1981 Report No. PB 83 188524
\$40.00 - printed (A24)
\$ 4.50 - microfiche (A01)

1982 Report No. PB 84 146158
\$23.50 - printed (A13)
\$ 4.50 - microfiche (A01)

1983 Report No. PB 85 241370
\$26.50 - printed (A15)
\$ 4.50 - microfiche (A01)

1984 Report No. PB 86 184447/AS
\$22.95 - printed (A13)
\$ 5.95 - microfiche (A01)

To order, write to the U.S. Department of Commerce, National Technical Information Service, 5285 Port Royal Road, Springfield, Virginia 22161, or telephone the sales desk at (703) 487-4650.

May 1986

Vol. XI No. 5

ENDANGERED SPECIES

Technical Bulletin

Department of Interior U.S. Fish and Wildlife Service
Endangered Species Program, Washington, D.C. 20240

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ENDANGERED SPECIES

Technical Bulletin

Department of Interior, U.S. Fish and Wildlife Service
Endangered Species Program, Washington, D.C. 20240

Federal Protection Proposed for Five Species

During the month of May, the Fish and Wildlife Service (FWS) proposed to add the following species, four animals and one plant, to the U.S. List of Endangered and Threatened Wildlife and Plants:

Mount Graham Red Squirrel (*Tamiasciurus hudsonicus grahamensis*)

The red squirrel, *Tamiasciurus hudsonicus*, is found in most of Canada and Alaska, and in many of the western and northern parts of the conterminous United States. This species is arboreal and, in the southern extremities of its range, is restricted mainly to montane forests. It is grayish-brown, tinged with a rusty or yellowish color along the back, and has a bushy tail. One of the southernmost subspecies of red squirrel is *T. h. grahamensis*, the Mount Graham red squirrel, which is known only from the Pinaleno (or Graham) Mountains of Graham County, Arizona. This red squirrel is now found within the Coronado National Forest, primarily in stands of dense Engelmann spruce and/or fir at elevations mostly above 10,000 feet (3,048 meters).

The Mount Graham red squirrel was common around the turn of the century, but was declining by the 1920's and rare by the 1950's, presumably due to the loss and disruption of its forest habitat. Another possible factor in the decline may be competition with an introduced population of the tassel-eared squirrel (*Sciurus aberti*). From 1958 to 1967, there was only a single unconfirmed report of the red squirrel subspecies, and there was concern that it had become extinct. Later, however, its survival was verified, and a FWS-funded status survey in 1984-1985 found signs of this mammal at 16 localities in the Pinalenos. Although the squirrel does still survive, its range and numbers have been substantially reduced, and it appears to be common only in small, scattered patches of the best habitat. The total remaining red squirrel population in the Pinalenos is estimated at fewer than 500 individuals, possibly close to only 300.

The decline of the Mount Graham red squirrel seems to parallel the expansion of logging operations in the Pinalenos,



Mount Graham red squirrel

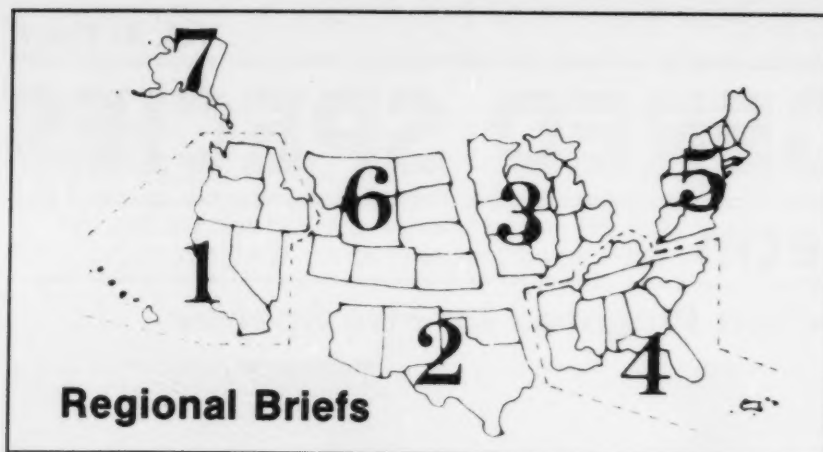
which began in the 1880's but was not initially widespread. By 1933, roads had been constructed to the crest of the mountains, and by 1973, most of the accessible timber had been cut, thereby

reducing the red squirrel's forest habitat. Future timber harvesting in the Pinalenos could result in a further decline of the squirrel's population.

(continued on page 4)

photo by Rich Glinicki

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Regional Briefs

Endangered Species Program regional staffers have reported the following activities for the month of May:

Region 1—The Sacramento Endangered Species Office (SESO) reported that six bald eagles (*Haliaeetus leucocephalus*) eggs were taken from three Cali-

fornia nests in an attempt to increase production. The eggs were transferred to the Santa Cruz Predatory Bird Research Group for hatching, where three of them hatched successfully. The nestling eagles will become part of a captive breeding population to be held

at San Francisco Zoo or will be released in the wild through hacking.

The SESO staff also coordinated the development of the Interagency Pit River Bald Eagle Management Plan. It was developed by the U.S. Forest Service, Bureau of Land Management, California Department of Fish and Game, and Pacific Gas and Electric Company. The plan provides for long-term management of nine currently active bald eagle nesting territories, expansion of three additional territories, and habitat for nonbreeding and wintering eagle use.

The FWS Great Basin Complex at Reno, Nevada, reported that a pair of Endangered bald eagles is again present in the Salmon Falls River Canyon near Jackpot, Nevada. A pair of eagles was present at the same place a year ago, but the nest was abandoned in mid-April following human disturbance in the area. The return of a nesting pair is a significant event because no successful nesting of bald eagles in Nevada has been known since 1866.

Forty-two eggs were removed from 14 California peregrine falcon (*Falco peregrinus*) nest sites by The Peregrine Fund at Santa Cruz in a continued effort to improve wild reproduction. Artificial or "dummy" eggs were placed in 13 of the nests, while the fourteenth pair was allowed to "double clutch," or lay a second set.

A recent oil spill in Buena Vista Valley resulted in the death of 14 giant kangaroo rats (*Dipodomys ingens*). This animal is currently proposed for Endangered Species Act (ESA) listing. (See story in BULLETIN Vol. X No. 9.) A meeting is planned with representatives of several oil companies to discuss clean-up and restoration.

A project involving the expansion of a refined petroleum products pipeline from Norwalk to San Diego, California, by the San Diego Pipeline Company has resulted in extensive damage to wetland habitats of San Elijo Lagoon. The FWS informed the COE and the pipeline company that there could be possible impacts to the least Bell's vireo (*Vireo bellii pusillus*) proposed Critical Habitat, the light-footed clapper rail (*Rallus longirostris levipes*), and the California least tern (*Sterna antillarum browni*).

Figures recently released by the Oregon Department of Fish and Wildlife and the Klamath Indian Tribe revealed that sucker populations in the Klamath River basin are experiencing a precipitous decline. The average number of shortnose suckers (*Chasmistes brevirostris*) and Lost River suckers (*Deltistes luxatus*), both Category-2 listing candidates, that were captured during each

(continued on page 9)

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U.S. Fish and Wildlife Service Regions

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The ENDANGERED SPECIES TECHNICAL BULLETIN is published monthly by the U.S. Fish and Wildlife Service, Department of the Interior, Washington, D.C. 20240.

Listings Become Final for Four Plants and Nine Animals

The following U.S. and foreign taxa were added to the Federal List of Endangered and Threatened Wildlife and Plants during May 1986:

***Chrysopsis floridana* (Florida Golden Aster)**

This perennial herb in the family Asteraceae is endemic to small areas of ancient dunes in Hillsborough, Manatee, and Pinellas Counties, Florida. The plants grow in open, sunny areas within sand pine/evergreen oak scrub vegetation on well-drained, fine sand. Urbanization has eliminated *C. floridana* from much of its historical range, and the two largest remaining sites are vulnerable to residential construction. All known populations are on privately owned lands.

C. floridana was proposed by the FWS for listing as an Endangered species on August 5, 1985 (see summary in BULLETIN Vol. X No. 9), and the final rule was published in the May 16, 1986, *Federal Register*.

***Scaevola coriacea* (Dwarf Naupaka)**

Although once prevalent throughout the main Hawaiian Islands, this prostrate shrub in the family Goodeniaceae now survives on only four small areas of State and private land in Maui County. Two of the sites are on Maui itself, one is on a nearby islet, and one is on an islet east of Molokai. The only significant population, one near Waiehu Point on the island of Maui, is threatened by residential development, which will eliminate nearly two-thirds of the species' total habitat.

The July 16, 1985, proposal to list *S. coriacea* as Endangered (see summary in BULLETIN Vol. X No. 8) was made final on May 16, 1986.

***Iliamna corei* (Peter's Mountain Mallow)**

A single population of this perennial in the family Malvaceae exists on private land near the summit of Peter's Mountain in Giles County, western Virginia. *I. corei* is known only from that site, and the September 1985 count of five individual plants is about one-tenth the number noted when the species was discovered in 1927. Encroachment of the site by competing vegetation, particularly the non-native Canadian leafcup (*Polymnia canadensis*), is reducing the open sunlight apparently needed by *I. corei*. Because of the species' very low numbers, browsing by white-tailed deer (*Odocoileus virginianus*) is another sig-

nificant factor in reducing or suppressing the population.

I. corei was proposed for listing as an Endangered species on September 30, 1985 (see summary in BULLETIN Vol. X No. 10), and the listing became final on May 12, 1986.

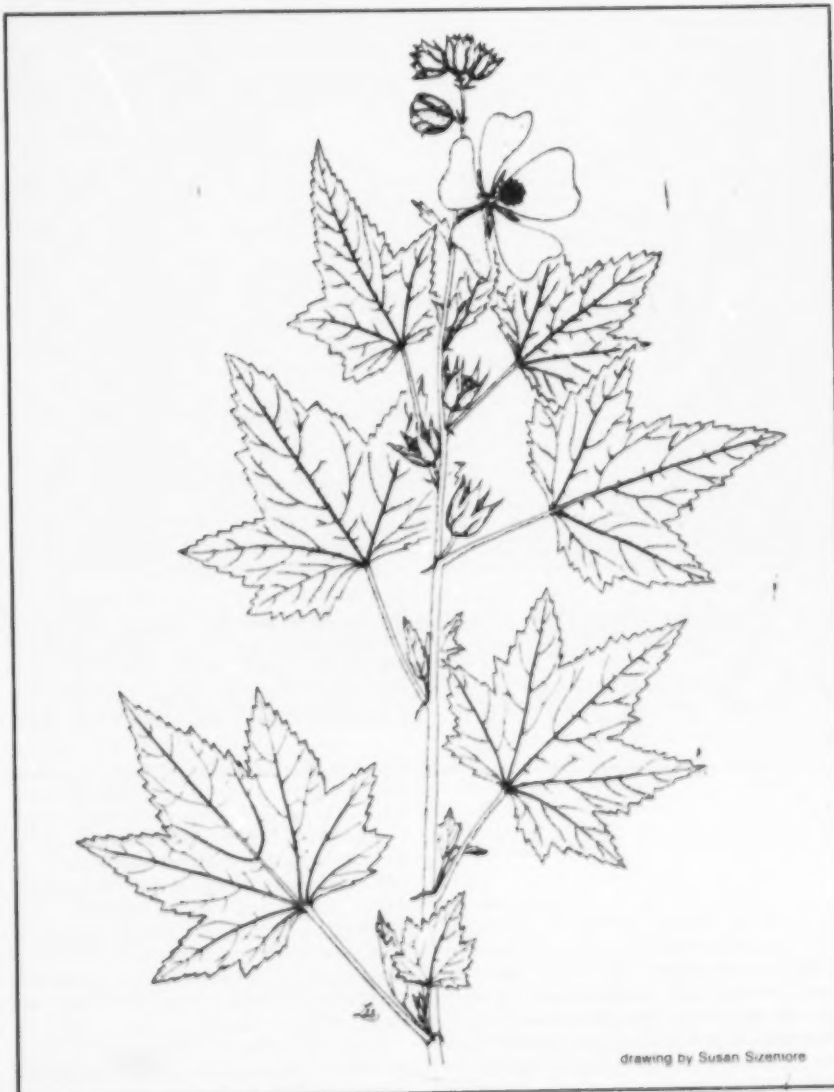
***Cycladenia humilis* var. *jonesii* (Jones Cycladenia)**

This member of the dogbane family (Apocynaceae) is a herbaceous perennial that reaches 4 to 6 inches (10 to 15 centimeters) in height and produces rosy flowers said to resemble small morning-glories. It is known to occur only on three general areas of the

Canyonlands region of southeastern Utah; a fourth population may at least once have occurred near a section of the Utah/Arizona border. Of a total of approximately 7,500 known individuals, more than half of the plants are on Bureau of Land Management lands, about 2,500 are on units of the National Park System (Glen Canyon National Recreation Area and Capitol Reef National Park), and around 500 are on State of Utah lands.

Oil and gas leases have been issued either on or immediately adjacent to all of the species' known extant sites, and mining claims have been staked in the

(continued on page 4)



Iliamna corei

drawing by Susan Sizemore

Final Listings

(continued from page 3)

vicinity of the San Rafael Swell population. Off-road vehicle traffic, exploration, and other activities associated with the potential future development of these areas already are damaging the habitat.

In light of these threats, the FWS proposed on January 10, 1985, to list the Jones cycladenia as an Endangered species. Subsequently, the National Park Service located several additional colonies that more than doubled the previously known total population. Because of the increased numbers but continuing threats, the FWS decided that a final listing of the species as Threatened (rather than Endangered) was more appropriate. The final rule was published May 2, 1986.

Least Bell's Vireo (*Vireo bellii pusillus*)

No other passerine (perching songbird) in California is known to have declined as dramatically as the least Bell's vireo. This small, gray, migratory bird once was widespread and abundant, its historical breeding range extending from interior northern California to northwestern Baja California, Mexico. Over the past several decades, however, the subspecies has been completely extirpated from the Sacramento and San Joaquin Valleys, which were at the center of its breeding range. The vireo's U.S. range is reduced to southwestern California, within which it survives in isolated remnants of dense, willow-dominated riparian habitat. This restricted habitat type is limited to the immediate vicinity of water courses.

Almost all of the subspecies' historical riparian habitat has been destroyed by flood control and water development projects, crop production, livestock grazing, invasive exotic plants, off-road vehicles, and urbanization. Despite growing concern at all levels of government about the decline of riparian vegetation, substantial amounts continue to be lost each year. Approximately 65 per-

cent of the remaining U.S. population of the least Bell's vireo is threatened by at least four major construction projects (details in May 2, 1986, *Federal Register*).

The brown-headed cowbird (*Molothrus ater*), a species that is able to adapt to human-related changes in the habitat, is greatly increasing its range in California. Cowbirds do not build their own nests, but instead parasitize the nests of other bird species, including (but not limited to) those of the vireo. This problem is compounding the other pressures facing the vireo and greatly reducing the subspecies' nesting success within the remaining breeding habitat.

Along with its May 3, 1985, proposal to list the least Bell's vireo as Endangered (summary in BULLETIN Vol. X No. 6), the FWS also proposed designation of Critical Habitat for the bird. However, the FWS is required to evaluate economic impacts of such designations, and because of the complexities and extent of the activities being assessed, the evaluation is not yet complete. Concurrently with the May 2, 1986, publication of the rule listing the least Bell's vireo as Endangered, the FWS reopened the public comment period on the proposed Critical Habitat designation until July 31, 1986. (Comments should be sent to the Regional Director, Region 1—see BULLETIN page 2). A final decision on designating Critical Habitat must be made no later than May 3, 1987. In the meantime, the vireo will receive the other habitat protection measures authorized under Section 7 of the Endangered Species Act.

Eight Foreign Mammals

On October 25, 1985, the FWS proposed listing eight foreign mammals as Endangered. (See feature in BULLETIN Vol. X No. 11.) Three of these are threatened by deforestation: **Leadbeater's possum** (*Gymnobelideus leadbeateri*), one of Australia's endemic marsupials, and the **buffy tufted-ear marmoset** (*Callithrix jacchus aurlita*), and **southern bearded saki** (*Chiropotes satanas satanas*), two Brazilian primates. Four Cuban rodents, the **large-eared hutia** (*Capromys auri-*

tus), **little earth hutia** (*C. sanfelipensis*), **dwarf hutia** (*C. nana*), and **Cabrera's hutia** (*C. angelcabrerae*), are taken for use as food by fishermen and others who visit the tiny islands where these animals live. The **Baluchistan bear** (*Ursus thibetanus gedrosianus*), restricted to mountains in Pakistan and, possibly, Iran, is regarded as vermin and killed by farmers, who claim that it damages their crops and kills livestock.

The final rule listing these foreign animals as Endangered was published May 5, 1986. Although U.S. law cannot protect animals and their habitat in other countries, the Endangered Species Act does prohibit their importation into the U.S., except under Federal permit for conservation purposes. Also, through Section 8 of the Act, the Secretary of the Interior is authorized to provide funding (if money is available) and training assistance to foreign wildlife departments.

Available Conservation Measures

The FWS is required by the Endangered Species Act to develop and implement recovery plans for all listed species in the U.S. Further, the Act makes it illegal to take, possess, transport, and engage in interstate or international trafficking in listed animals without a permit. Similar protection is afforded to listed plants, except that the prohibition on taking applies only to collection of listed plants from lands under Federal jurisdiction. Some States, however, have their own laws regarding the take of listed plants on private lands.

Habitat conservation is addressed in Section 7 of the Act, which requires Federal agencies to ensure that activities they fund, authorize, or carry out are not likely to jeopardize the survival of listed species or adversely modify designated Critical Habitat. Because Critical Habitat designations require publication of detailed habitat descriptions and maps, it was deemed prudent to forego this action for species that are particularly vulnerable to collecting or vandalism; nevertheless, their habitat is protected under Section 7.

Proposed Species

(continued from page 1)

Additional threats to the subspecies include the proposed construction of an astrophysical facility on Mount Graham, road construction and improvements, and recreational developments, including picnic areas, campgrounds, and ski facilities. Considering the squirrel's low numbers and restricted range, any new habitat disturbances could contribute to its extinction.

On May 21, 1986, the FWS published a proposed rule in the *Federal Register* to list the Mount Graham red squirrel as Endangered. Given its history of decline, its vulnerability, and the multiplicity of problems that confront it, this animal could greatly benefit from the protection of the Endangered Species Act (ESA).

Critical Habitat for the Mount Graham red squirrel has been designated in the proposed rule to include three areas in the Coronado National Forest—Haw

Peak/Mount Graham, Heliograph Peak, and Webb Peak. These three areas, which cover a total of approximately 2,000 acres (800 hectares), contain the major known concentrations of the subspecies and the habitat necessary to its survival, including cover, food sources, and nest sites. Potential activities that could adversely affect the Critical Habitat include timber harvesting, recreational development, and construction of the proposed astrophysical facility on

(continued on next page)

Mount Graham. Since all of the proposed Critical Habitat of the Mount Graham red squirrel is located within a national forest, any of these activities could require the U.S. Forest Service to enter into consultation with the FWS, under Section 7 of the ESA.

Comments on this proposed rule are welcome and should be sent to the Regional Director, Region 2 (address on page 2), by July 21, 1986.

Blackside Dace (*Phoxinus cumberlandensis*)

This small fish, which inhabits cool-water streams in the upper Cumberland River system in southeastern Kentucky and northwestern Tennessee, is believed to have disappeared from many waters within its historical range. Degradation of its aquatic habitat by certain mining, logging, agricultural, and road construction activities is blamed for the decline. Because of continuing threats to the limited amount of remaining habitat, the FWS proposed listing the species on May 21 as Threatened.

The blackside dace is a distinctively marked fish, with a single black lateral stripe, a green/gold back dotted by black specks, a pale to sometimes brilliant scarlet belly, and fins that are often bright yellow. It is usually less than 3 inches (7.6 centimeters) in length. Streams inhabited by the dace are only 7 to 15 feet (2 to 4.5 meters) wide with moderate flows, undercut banks, and large rocks. Good riparian vegetation appears to be necessary for minimizing silt and maintaining cool water temperatures. The species is not found in streams that have become excessively silty.

Although the extent of the blackside dace's historical distribution is not known, available records show that it has been extirpated from at least 10 streams. Physical habitat evaluations indicate that it also may have occurred in at least 52 other streams, from which it was eliminated before its discovery in 1975. Currently, the species is known from a total of only about 14 stream miles (22.5 kilometers) scattered throughout 30 separate streams. Only nine of these streams, consisting of approximately 8 miles (13 km) of habitat, are estimated to contain healthy dace populations. Most of the other populations are being affected by siltation or some other factor that seriously limits their size and vigor.

The areas of Kentucky and Tennessee inhabited by the blackside dace are rich in coal reserves and forest resources. It is believed that habitat degradation associated with the development of these resources is responsible for the loss of many dace populations. The most frequently cited continuing threat consists of problems related to coal mining (silt and acid drainage), followed in



photo by John MacGregor



photo by Dick Higgins

Good stream habitat for the blackside dace (above). Road construction and siltation (below) have eliminated the fish from some of its former range.

order of impact by logging, road construction, agriculture, development, and natural low water flows.

In the listing proposal, the FWS emphasizes that current mining activities conducted in accordance with State and Federal regulations are not a serious threat to the species. It was past unregulated mining that contributed to the decline of the blackside dace, although the lingering effects of erosion and acid drainage from old mining sites probably are a continuing threat. Current mining operations not in full compliance with applicable regulations is another possible danger.

Federal activities that could affect the dace and its habitat include, but are not limited to, issuance of permits for sur-

face mining; abandoned mine land reclamation; road and bridge construction; and timber management on Federal lands. It should be emphasized, however, that considering the needs of vulnerable species early in project planning almost always prevents potential conflicts and allows project goals to be met while providing for species conservation.

Comments on the proposal to list the blackside dace as Threatened should be sent to the Field Supervisor, Endangered Species Field Station, U.S. Fish and Wildlife Service, 100 Otis Street, Room 224, Asheville, North Carolina 28801 by July 21, 1986.

(continued on next page)

Florida Scrub Jay (*Aphelocoma coerulescens coerulescens*)

The Florida scrub jay is a bluish-colored, crestless bird that reaches 12 inches (30 centimeters) in total length. A necklace of blue feathers separates its white throat from gray underparts, and a white line over the bird's eye often blends into a whitish forehead. Florida scrub jays are long-lived (10 years or more), sedentary, and permanently monogamous. They are omnivorous, eating almost anything they can catch, but they concentrate on lizards and arthropods in spring and summer, and acorns in fall and winter.

The species *Aphelocoma coerulescens* is widely distributed in the western United States, but the Florida subspecies, *A. c. coerulescens*, is restricted to scattered and often isolated patches of oak scrub in peninsular Florida, which occurs on fine, white, drained sand. These areas have high real estate value in this rapidly growing State, and as a

result, many of the coastal areas inhabited by the Florida scrub jay have been cleared for construction of beachfront hotels, houses, and condominiums. Scrub habitats in the interior of the Florida peninsula are also changing; they are subject to development for citrus groves as well as for housing developments. In many areas, scrub jays are barely hanging on, and they will probably disappear from these areas within a few years as land clearing continues.

In the past, scrub jays were reported to have occupied 40 Florida counties, but today they have been completely eliminated from some areas (40 percent of their historical locations), and their numbers have drastically declined in others. The Florida scrub jay's total population has dropped by about half in the past century, leaving between 15,000 and 22,000 birds now known to survive. Of these remaining jays, over 80 percent occur in only two general areas: Merritt Island/Cape Canaveral (Brevard County) and Ocala National Forest (Lake, Marion, and Putnam Counties). Elsewhere, only small populations are

scattered throughout peninsular Florida.

By far, habitat destruction has played the major role in the Florida scrub jay's decline, but there is evidence that, in St. Johns County at least, some scrub jays have been shot by vandals. In addition, the tameness and beauty of this bird make it desirable as a pet, and although illegal, it has been used for such a purpose in the past. Another threat to this vulnerable bird's existence is the suppression of fires to protect human interests. Historically, natural-caused fires were major factors in maintaining the sparse, low scrub vegetation preferred by *A. c. coerulescens*.

Although the Florida scrub jay is protected by the Migratory Bird Treaty Act and Florida State law, these laws do not protect the bird from habitat destruction. To protect and manage the surviving populations, the FWS proposed to list this subspecies as Threatened on May 21, 1986. If the proposed rule is made final, the protection authorized by the Endangered Species Act may prevent further peril to this bird.

There are four known Federal agencies whose activities may be affected if the Florida scrub jay is listed as a Threatened species. They are the Fish and Wildlife Service (Merritt Island National Wildlife Refuge), National Aeronautics and Space Administration (Kennedy Space Center), U.S. Air Force (Cape Canaveral Air Force Station and Avon Park Bombing Range), and U.S. Forest Service (Ocala National Forest). Impacts on these agencies, however, should be minimal since, to varying degrees, they are already managing their lands in accordance with the scrub jay's needs. The subspecies also occurs on lands managed by the State of Florida, which has informally notified the FWS that it fully supports the proposed listing.

Comments on this listing proposal are invited and should be sent by July 21, 1986, to the Field Supervisor, Endangered Species Field Station, U.S. Fish and Wildlife Service, 2747 Art Museum Drive, Jacksonville, Florida 32207.

Cambarus zophonastes

Cambarus zophonastes, a cave crayfish endemic to the White River Basin in north-central Arkansas, was proposed for listing as Endangered on May 5, 1986. First collected in 1961, its only known habitat is a cave located in the Ozark Mountains in Stone County. Over 170 other caves in north-central Arkansas have been searched, but there has been no additional evidence of the species. In Missouri, numerous caves and several springs were surveyed, but only two closely related species were found, *C. hubrichti* and *C. setosus*.

(continued on next page)



photo courtesy of Florida Audubon Society

The Florida scrub jay's future depends to a great extent on the fate of its oak scrub habitat.

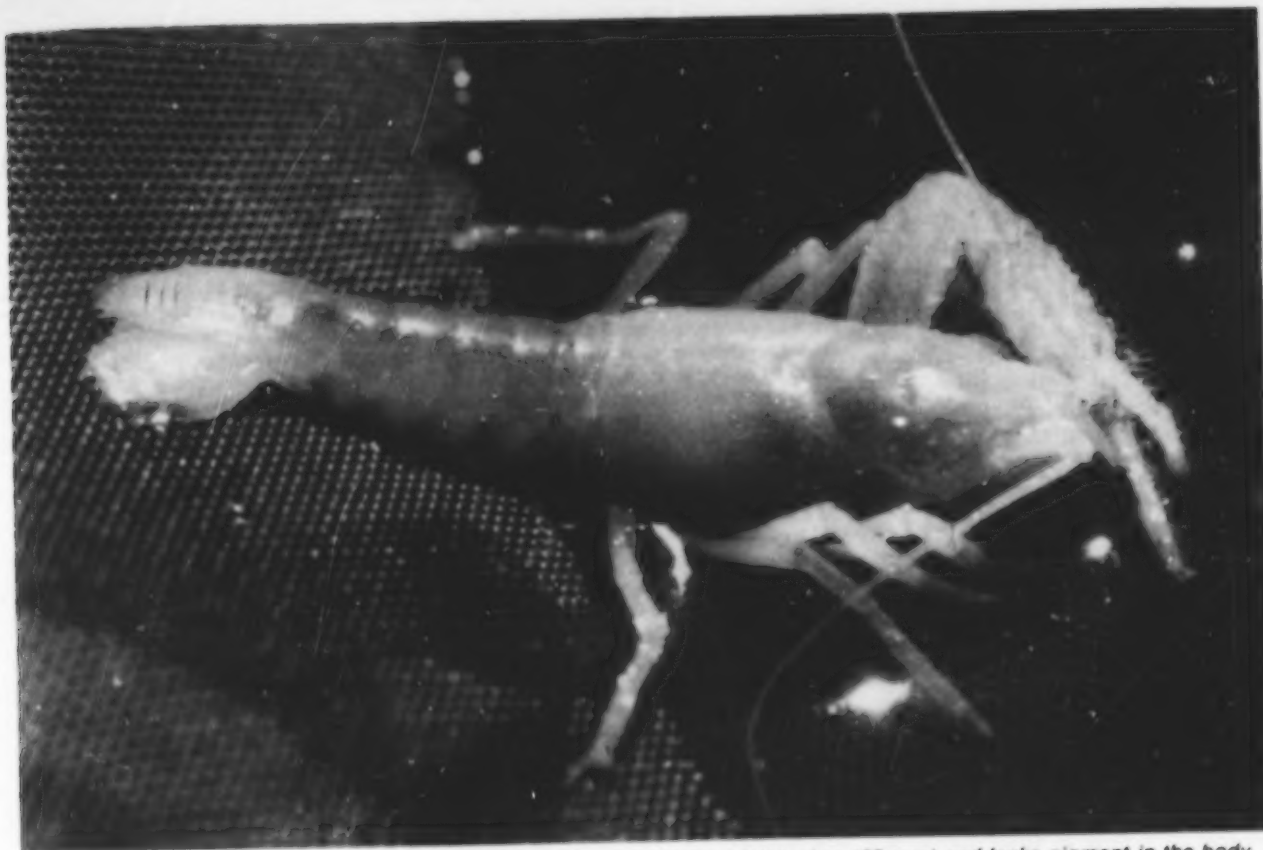


photo by Ken Smith

Cambarus zophonastes is an obligate cave dweller that grows to about 2.5 inches (65 mm) and lacks pigment in the body and eyes.

The cave in which *C. zophonastes* dwells is a solution channel, most of which is wet year-round. It contains a considerable amount of mud, and many of its passages are flooded during storms and wet seasons. About 150 feet (45 meters) inside the cave is a pool with a narrow, shallow stream entering into it from the cave's interior. The crayfish has been found only in this cave pool.

One factor that threatens this cave species' existence is its relatively low reproductive capability, which is partially due to the limited energy available in most caves. The cave inhabited by *C. zophonastes* likely once served as a maternity roost by the gray bat (*Myotis grisescens*), itself now listed as Endangered. Abandonment of the roost site represented a loss of energy input, in the form of guano, to the cave's aquatic community; as a result, the available food supply for the crayfish and other species dwindled.

Groundwater contamination now presents the main threat to *C. zophonastes*. The only known population of the species, consisting of approximately 50 individuals, is in a geographic area characterized by sinking streams, which lose significant quantities of water into the subsurface in very localized areas. Sinking streams are of extreme importance in supplying water and nutrients

to caves, but they also can readily introduce pollutants or contaminants into the cave system. A hydrological study conducted in 1985 has positively identified threats to this system, and they ultimately may threaten the remaining population of *C. zophonastes*. Continuing development in the area also threatens the water quality in the cave due to the use of septic tanks to dispose of wastewater. This water degradation problem may involve the Environmental Protection Agency or other agencies with jurisdiction over groundwater. If the crayfish becomes listed, these agencies may be required to consult with the FWS under Section 7 of the Endangered Species Act to ensure that their activities will not likely jeopardize this species' survival. The Federal Housing Authority may also be required to consult with the FWS on loans for housing developments within the cave's recharge area.

The crayfish also is vulnerable to vandalism and taking. With such a small surviving population in one location, these threats or any other adversity could bring about the extinction of *C. zophonastes*. If the proposed rule to list the species is approved, the Endangered Species Act will give *C. zophonastes* the greatest Federal protection available.

Comments on the proposed rule are welcome and should be sent by July 7,

1986, to the Endangered Species Field Station, U.S. Fish and Wildlife Service, Jackson Mall Office Center, Suite 316, 300 Woodrow Wilson Avenue, Jackson, Mississippi 39213.

Wide-leaf Warea (*Warea amplexifolia*)

W. amplexifolia, a summer annual in the mustard family (Brassicaceae), is an erect herb growing up to about 3 feet (0.8 meter) in height. Its slender, branching stems arise from an elongate taproot and bear small, heart-shaped leaves. The showy, pale purple flowers are borne in puff-like clusters at the ends of the branches.

Endemic to the Lake Wales Ridge of central Florida, *W. amplexifolia* was known historically from 10 sites in Lake County, western Orange County, extreme northwestern Osceola County, and northern Polk County. It is now limited, however, to only four sites in Lake and Polk Counties. All six of the others were destroyed when their habitat was converted to citrus groves or was urbanized. Three of the remaining sites are privately owned; two of them, including the location of the largest population, are very vulnerable to development pressures, while the third is in a preserve

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Proposed Species

(continued from previous page)

at Bok Tower Gardens. The fourth is on a 1-acre (0.4-hectare) woodland within Lake Griffin State Recreation Area. Altogether, fewer than 1,200 plants are known to survive on a total of less than 65 acres (26 ha) of land.

The FWS proposed on May 16 to list *W. amplexifolia* as Endangered. Comments on the proposal should be sent to the Field Supervisor, Endangered Species Field Station, U.S. Fish and Wildlife Service, 2747 Art Museum Drive, Jacksonville, Florida 32207, by July 15, 1986.

Effects of the Listings, if Approved

If each of the proposals is made final, these five species will receive all the protection benefits authorized by the Endangered Species Act. Among these benefits are the requirement for the FWS to develop and implement plans for the species' recovery, possible Federal aid to State conservation programs, and prohibitions against certain practices.

Under Section 7 of the Act, Federal agencies are required to ensure that any activities they fund, authorize, or carry out are not likely to jeopardize the survival of any listed species or adversely modify its Critical Habitat. If a Federal

agency finds that one of its activities may affect such a species, it must consult with the FWS on ways to avoid jeopardy. These Section 7 regulations will apply to all five species if they are listed, even though a formal designation of Critical Habitat was not part of the proposed rules for the blackside dace, the cave crayfish, the scrub jay, or the wide-leaf warea.

The Act also prohibits the possession, take, or transport of listed animals. For listed plants, the rule is different; removing Endangered plants is illegal only if the plants are located on Federal lands. Interstate or international trafficking in listed species is also prohibited, except under Federal permit.

Approved Recovery Plan

Lotis Blue Butterfly

Perhaps the rarest resident butterfly in the United States, the Lotis blue (*Lycaeides idas* (formerly *argyrognomon*) *lotis*) is known to survive only at a 5-acre (2-hectare) site in Mendocino County, California. During 1977-1981, only 16 adult specimens were seen in 42 days of field searching at the site. The restricted range and small population size of this butterfly make it highly vulnerable to extinction from natural or human-related changes in its habitat, and it was listed in 1976 by the FWS as Endangered. Specific recommendations in the *Lotis Blue Butterfly Recovery Plan* may, when implemented, restore the subspecies to a secure status.

The Lotis blue butterfly probably was never abundant, but historical records indicate seven localized occurrences in coastal areas of Mendocino, northern Sonoma, and, possibly, Marin Counties. Its habitat consisted of wet meadows and sphagnum-willow bogs. Today, the sole known population is found at a sphagnum bog in the Pygmy Forest north of the town of Mendocino. The butterfly's larval foodplant has not been positively identified, but the coast trefoil (*Lotus formosissimus*), a herbaceous perennial legume, is considered the primary candidate.

The reasons for the decline of the Lotis blue butterfly are largely speculative or limited to circumstantial evidence. Natural factors could be at least partially responsible. Abundance of the butterfly's suspected larval foodplant has been affected by drought and succession of the plant community. Under more natural conditions, and with the other colonies as a reserve, the butterfly probably could recover from such habitat changes; many butterfly taxa undergo cyclical population highs and lows. Human land management practices, however, also may be affecting the Lotis

blue butterfly. For example, fire suppression promotes vegetational succession. Logging of the forests also can reduce the foodplant supply through associated hydrological changes and through road construction, which opens logged areas for urbanization. The recovery plan points out, however, that foodplant distribution is not necessarily the key to the presence of the Lotis blue butterfly because the butterfly does not occur in all areas that contain *L. formosissimus*.

At present, the remaining colony's habitat is in a near natural condition; however, because it is so small, it is vulnerable to even a very localized disturbance. Potential threats include logging, powerline corridor maintenance, use of herbicides or insecticides, and impoundment or drainage of water. Several exotic annual grasses are abundant and may need to be removed before they completely displace the native vegetation. Because the population is so small, another threat is collecting.

Recovery Actions

The *Lotis Blue Butterfly Recovery Plan*, written under contract by Dr. Richard A. Arnold and approved by the FWS on December 26, 1985, recognizes that there is a critical need for more information before specific recovery strategies and goals can be established. A primary element of the recovery plan is to conduct additional research into the life history, distribution, and habitat requirements of the Lotis blue. Also needed is a more complete understanding of the factors leading to the butterfly's decline.

The interim objectives of the recovery plan are: 1) to protect the butterfly and its habitat at the existing site; 2) to establish three new self-sustaining populations at other sites of at least equal area; and 3) to determine the population levels and habitat conditions necessary for reclassification and eventual recovery.

Preserving the only known habitat obviously is the first priority. The recovery plan recommends seeking a conservation agreement with the property owner and development of a Land Protection Plan, while coordinating with State and local governments, the California Coastal Commission, and nearby landowners. Certain land management practices may affect the butterfly's chances for recovery. For example, drift from aerial, non-specific applications of herbicides and insecticides could swiftly kill off the Lotis blue butterfly or eliminate its host and nectar plants. If the use of such chemicals is absolutely necessary, the FWS will encourage application by hand on specific targets. The recovery plan also recommends that activities like over-draft of the aquifer and "brushing" of the vegetation for fire control, which could remove or damage the host plants, be minimized as much as possible. Cooperation with Pacific Gas and Electric, which owns a right-of-way through the butterfly habitat, will be important.

Another important part of the recovery plan is to continue surveying potential habitat in order to locate any additional Lotis blue butterfly populations that may still exist. Among the areas that should be visited during the butterfly's flight season are historical collection sites near Point Arena, Pygmy Forest, Russian Gulch State Park, Van Damme State Park, Big River, and Big Lagoon, which may still, or once again, contain some suitable habitat. However, research to positively determine the larval and adult food plants of this butterfly, along with studies on other aspects of its autecology, is needed to make such surveys fully effective. When this information is gathered, biologists can evaluate vegetation management and identify potential reintroduction habitat for the butterfly.

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Recovery Plan

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Two different methods of establishing the additional populations of the Lotis blue butterfly called for in the recovery plan will be examined. The first possibility is to move some of the adults from the extant site to other locations; this may be attempted only if and when it is determined that the extant population is large enough to withstand the reduction and remain self-sustaining. The other possibility is to bring some of the butterflies into a laboratory for captive propagation, with the goal of releasing their offspring at new sites. Again, such an approach would depend on the status of the extant population. Rearing and relo-

cation techniques would first be developed using related, but non-endangered, butterfly taxa. Surrogates also could be used in formulating management and survey methods to be used in other aspects of the Lotis blue recovery plan.

Following the establishment of four colonies of the Lotis blue butterfly, the plan can be reevaluated to determine specific recovery goals that would allow for reclassification and eventual delisting. The current and future colonies should be monitored regularly for a sufficiently long time (perhaps 3 to 5 years) to estimate their chances for long-term survival as self-sustaining populations. Because of its limited potential range, however, the Lotis blue butterfly may always be vulnerable.

Patuxent Wildlife Research Center in Maryland to augment the captive breeding flock.

The recovery of a previously stocked juvenile Colorado squawfish (*Ptychocheilus lucius*) from Arizona's Salt River by FWS and Arizona Game and Fish Department biologists marks the first time in over 30 years that the species has survived in that river. The 6-inch fish was the first to be recovered from the Salt River as the result of a stocking program initiated last fall under the "experimental" population designation. The fish was stocked as a 2- to 3-inch fingerling in September 1985, along with 23,300 other fingerlings, for part of a 10-year reintroduction program designed to reestablish the species in the rivers of the lower Colorado River basin. Over 300 adult squawfish were stocked into the Verde River at the same time; to date, 12 of those have been recaptured.

Regional Briefs

(continued from page 2)

collection trip in the last 3 years are as follows:

Year	Average Number of Shortnose Suckers	Average Number of Lost River Suckers
1984	17.3	56
1985	11.5	43
1986	3.0	29

A third Category-2 candidate species, the Klamath largescale sucker (*Catostomus snyderi*), also is declining.

Spawning runs this year were very early and brief. By the end of April, fisheries biologists had captured only 10 shortnose suckers. These declines are particularly distressing when the fish is considered. The observed declines greatly exceed what might be expected from natural mortality. An emergency ESA listing is being considered.

Cui-ui (*Chasmistes cujus*) are off and running on their annual spawning trek up the Truckee River. As of the end of April, Great Basin Complex personnel and several volunteers had helped 29,959 cui-ui over Marble Bluff Dam. Since the construction of the dam, cui-ui runs have begun between late April and mid-May. This year, for some undetermined reason, the run began on March 28. Within a matter of days, the run increased from one or two fish per day to a peak of 5,400 fish on April 10. The run gradually decreased to only a hundred or so fish per day by early May.

Pyramid Lake cutthroat trout are once again ascending the Truckee River, a world class trout stream. As of June 4, FWS personnel have helped more than 1,400 Lahonian cutthroat trout (*Salmo clarki henshawi*), many in the 6-8 pound class, over Marble Bluff Dam. This is the

largest trout run in the fish facility's history. These fish will be able to reach some of their historical spawning areas near the California State line and contribute to the off-reservation sport fishery.

Endangered species biologists continued efforts to assist Nevada's Lund Irrigation District in its management of irrigation water from springs that are designated as Critical Habitat for the White River spinedace (*Lepidomeda albvallis*). In cooperation with the Nevada Department of Wildlife, a survey was conducted in Lund Springs and its outflow to determine the distribution of spinedace in this area; however, no spinedace were seen. The survey included the areas that the fish occupied last summer. Additional surveys will be conducted this summer to determine the status and distribution of this population. The Lund Irrigation District representatives have requested the FWS to prepare a management plan for the species by this fall that is compatible with their use of water from its habitat.

The Honolulu, Hawaii, Field Office assisted in the inspection of the ongoing construction of the State's Olinda Endangered Species Propagation Facility on Maui. The U.S. Army is constructing two large units to house captive Hawaiian crows or 'alalas (*Corvus hawaiiensis*). Although heavy rains during March and April have delayed construction efforts, work is now progressing well, and completion is expected by late July.

Region 2—Twenty-four whooping crane (*Grus americana*) eggs were picked up in Canada, where biologists found 27 nests. Several nests contained only a single egg. On May 27, 20 eggs were transferred to Gray's Lake National Wildlife Refuge (NWR) in Idaho for cross-fostering with wild sandhill cranes (*Grus canadensis*), and 4 were sent to

An abundance of adult caddis flies in the Parker, Arizona, area may be beneficial for extirpated Threatened and Endangered fishes. The Arizona Department of Health Services, the Bureau of Indian Affairs, and a State legislator have contacted the FWS regarding the nuisance caused by these non-biting flies and the potential use of native fishes to control them. Fingerling razorback suckers (*Xyrauchen texanus*) were stocked into that portion of the Colorado River at the end of May. Use of Endangered bonytail chubs (*Gila elegans*) will also be considered, depending upon additional coordination with State and Federal agencies. All parties concerned felt that the use of a biological control (fish) was more acceptable than chemical control.

During the 1986 whelping season, the Endangered red wolf (*Canis rufus*) captive breeding program produced three litters totaling 20 pups, and the Endangered Mexican wolf (*Canis lupus baileyi*) captive breeding program produced one litter of 7 pups. Sixteen of the red wolf pups survived, bringing the captive red wolf population to its current high of 80 animals distributed among 7 facilities. Six of the Mexican wolf pups survived, bringing the captive population of this gray wolf subspecies to 33 animals distributed among 3 facilities. A second Mexican wolf litter was anticipated; however, the mother and all three of her pups died during birth. Efforts are under way to increase the number of participating facilities in each program in order to expand the total population, and ultimately to reestablish the animals in the wild.

Four pairs of adult red wolves are proposed to be moved to the Alligator River NWR in North Carolina next fall for rees-

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Regional Briefs

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establishment in the wild the following spring.

Plant surveys in Texas have resulted in the discovery of populations of the Mathis spiderling (*Boerhavia mathisiana*), a Category-1 listing candidate plant, near Mathis, Texas. For a while, it was suggested that the spiderling may have been lost due to the demand for the caliche soils (a type of soil cemented by calcium carbonate) upon which it depends. Another survey for a few blooming large-fruited sand verbena (*Abronia macrocarpa*), also a Category-1 candidate, near College Station, Texas. Both species are scheduled to be proposed for ESA listing this year.

Preliminary results of the reintroduction of Knowlton's cactus (*Pediocactus knowltonii*) appear very good. An early May inventory of the newly established (fall 1983) population found all 105 of the individuals to be alive, and most of them were in excellent condition. Data on flowering and fruit set also were collected. Forty-five additional cacti were planted in mid-May to compare with the success of fall planting. The New Mexico Natural Resources Department will continue to monitor this new population, as well as the only known wild population, for ecological and population biology information.

Region 3—Gone for a quarter of a century, peregrine falcons are back on the Mississippi River bluffs of Minnesota and Wisconsin. On Saturday, April 26, a dozen Minnesota falconers staked out cliffs along the Mississippi River to monitor the birds. Five peregrines, including a pair, were found living on four cliffs, two in Wisconsin and two in Minnesota. Another three peregrines were reported at Weaver Dunes (MN), and two were reported in the Minneapolis area.

On April 25, a peregrine was sighted from inside a window of Region 3's Federal Building at a distance of about 20 feet. The bird apparently had landed on the roof, where the General Services Administration has installed a nest box.

On May 6, FWS representatives met with Bureau of Land Management and Wisconsin Department of Natural Resources personnel to discuss how oil and gas leases in Wisconsin will be handled with regard to Threatened and Endangered species. Nearly 150 lease applications have been received to date, with a number of them having the potential to affect wolves, bald eagles, and some State-listed species. The three agencies agreed on adequate safeguards for the listed species. These safeguards will be incorporated into a

Memorandum of Understanding that will also define the role of each agency in ensuring the compatibility of exploration leases and conservation of listed species.

Last year in Michigan, a pair of bald eagles built a nest in a tree within the median strip of Interstate 27. To prevent a traffic hazard, a cone was placed over the nest this spring to discourage its use, and two nesting platforms were constructed a short distance from the highway. The eagles have built a nest near one of the platforms and are using that platform as a sunning deck.

The first Kirtland's warbler (*Dendroica kirtlandii*) was heard at the breeding grounds in Michigan on May 7. It is expected that the Mack Lake Burn Area will attract breeding pairs for the first time this year. Vegetation studies have already begun there, and it is hoped that color-banding of warblers can begin this summer to provide data on site fidelity and dispersal. The annual Kirtland's warbler census was scheduled for June.

A meeting in May of the Higgin's Eye Pearly Mussel Recovery Team generated two immediate tasks: (1) to develop a preferred habitat description for use in ESA Section 7 consultations and (2) to review recent *Lampsilis higginsii* data and determine if any sites should be added to the essential habitat list.

Region 4—While conducting a study to determine the impact of surface mining on the flattened musk turtle (*Stenotherus depressus*) in Alabama, Dr. C. Kenneth Dodd, Jr., of the FWS Denver Wildlife Research Center station in Gainesville, Florida, discovered a disease problem in the best population. Almost one-fourth of the turtles caught in the last trap sample at the site were affected, and one-half of the turtles found basking were diseased. Pneumonia is thought to be the ailment; however, the Jackson, Mississippi, Endangered Species Field Station is contracting with the FWS Division of Research to allow Dr. Dodd to investigate and verify the disease, its magnitude, and cause.

The Jacksonville Endangered Species Field Station has contracted with the Florida Cooperative Fish and Wildlife Research Unit at the University of Florida in Gainesville to survey the status of nine species, seven mammals and two birds, that are endemic to Florida and Georgia. The data from the survey will be used to evaluate whether these species, now classified as listing candidates, qualify for listing proposals under the ESA.

Three of the mammals, the Anastasia Island mole (*Scalopus aquaticus anastasiae*), the Anastasia Island cotton

mouse (*Peromyscus gossypinus anastasiae*), and the Anastasia Island beach mouse (*Peromyscus polionotus phasma*), occur only on the Atlantic Islands and barrier beaches of southern Georgia and northern Florida. Four of the mammals, the Micco cottontail rabbit (*Sylvilagus floridanus ammophilus*), the Micco cotton rat (*Sigmodon hispidus littoralis*), the Southeast beach mouse (*Peromyscus polionotus niveiventris*), and Goff's pocket gopher (*Geomys pinetis goffi*), have been reported from the vicinity of Micco in Brevard County, on the east central coast of Florida. The two birds to be surveyed are the Smyrna seaside sparrow (*Ammodramus maritima pelonota*), which occurs on the east coast of Florida from Amelia Island to New Smyrna Beach, and the Wakulla seaside sparrow (*Ammodramus maritima junicola*), which is known from the Florida gulf coastal marshes from Taylor County to at least Franklin County.

In 1901, John Kunkel Small collected specimens of a dwarf palmetto in the pinelands of Coconut Grove, now part of Miami, Florida. Small was unsure about the taxonomic status of these plants, which are similar to both the scrub palmetto (*Sabal etonia*) and the cabbage palm (*Sabal palmetto*). In late 1985, Scott Zona published a solution to Small's uncertainty, naming the large-fruited dwarf palmetto of the Miami pinelands *Sabal miamiensis*.

The new species description was based on a limited number of herbarium specimens and only a few living plants. The former geographic range and habitat of this palmetto largely coincide with those of five Miami pine and rockland plants that were listed as Endangered or Threatened species in 1985. Data collected to assess the status of these species illustrate that little native vegetation remains in the Miami and Fort Lauderdale urban areas. The Jacksonville, Florida, Endangered Species Field Station is preparing a proposal to add this palmetto to the list of Endangered species.

Amphianthus pusillus and *Isoetes tegetiformans* are Category-2 plant listing candidates that are restricted to vernal pools on granite outcrops in the Piedmont physiographic region of the Southeast. *A. pusillus* is known from Georgia, Alabama, and South Carolina, while *I. tegetiformans* is endemic to Georgia. During March 1986, the Jackson, Mississippi, Endangered Species Field Office botanist visited most of the known sites for these species. Most granite outcrops are threatened by quarrying, off-road vehicle use, and trash dumping. These activities have destroyed or severely impacted many populations, and status reviews are

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photo by Jim Williams

Biologists used snorkeling and other methods in their recent search for the critically Endangered Maryland darter.

under way to determine if ESA listing proposals are warranted.

Region 5—The Northern Flying Squirrel Recovery Team held its second meeting May 14 and 15 in Staunton, Virginia. Non-game program personnel in Virginia and West Virginia are putting up nest boxes and conducting limited live-trapping in spruce/northern hardwood habitat in an effort to learn more about the two Endangered squirrels' (*Glaucomys sabrinus fuscus* and *G. s. coloratus*) distribution. These States and North Carolina plan to conduct a cooperative, in-depth study of the squirrels' life history and ecology.

On May 16, biologists from the FWS Washington Office of Endangered Species, Maryland Department of Natural Resources, and FWS Annapolis Endangered Species Field Station confirmed the existence of the Maryland darter (*Etheostoma sellare*) at its only known

recent location, a single riffle in Deer Creek, Harford County, Maryland. This highly Endangered fish, which was observed by one of the biologists while snorkeling, had not been seen since September 1983. The sighting was especially good news, in light of the sizeable spill of liquid manure that occurred upstream of the darter site last August.

On May 23, FWS representatives met with Maryland Natural Heritage Program personnel to plan projects for the protection and recovery of the Maryland darter. Projects include additional surveys for new populations, landowner education programs, and mapping pollution sources and land-use patterns along Deer Creek.

Six Delmarva Peninsula fox squirrels (*Sciurus niger cinereus*) from Maryland were released at Prime Hook National Wildlife Refuge in Delaware on May 30. This is the second of three releases as part of a recovery effort to restore popu-

lations of the squirrel to the State of Delaware.

Surveys to determine the number of nesting pairs of piping plovers (*Charadrius melodus*) are under way along the Atlantic coast. A storm tide in mid-May washed out many plover nests from Maine to Virginia. These birds often nest on beaches that are subject to washover by high tides, and nests are frequently lost.

Adult plovers will renest; however, second nesting efforts will coincide with the time of highest public use of its nesting habitat. Human disturbance of nesting birds is the major reason for the piping plovers' population decline along the east coast.

An information brochure and color poster describing threats to the piping plover and explaining how the public can protect the species is available from the regional office (address on page 2 of the BULLETIN).

Black-footed Ferret Workshop

A "Workshop on Reproductive Biology of Black-footed Ferrets and Small Population Biology as They Relate to Conservation" will be held August 13-15, 1986, at the University of Wyoming in Laramie. The workshop, sponsored by the University, the Wyoming Game and Fish Department, and the U.S. Fish and Wildlife Service, is open for attendance to all interested persons. For further information, contact Conferences and Institutes, P.O. Box 3972, University Station, Laramie, Wyoming 82071-3972; telephone 307/766-2124. Registration before August 1 is encouraged.

BULLETIN Available by Subscription

Although we would like to send the BULLETIN to everyone interested in endangered species, budgetary constraints make it necessary for us to limit general distribution to Federal and State agencies and official contacts of the Endangered Species Program. However, the BULLETIN is being reprinted and distributed to all others, on a non-profit subscription basis, by the University of Michigan. To subscribe, write to the *Endangered Species Technical Bulletin Reprint*, School of Natural Resources, University of Michigan, Ann Arbor, Michigan 48109-1115, or telephone 313/763-1312. The price for 12 monthly issues is \$12.00 (in Canada, \$17 US).

BOX SCORE OF LISTINGS/RECOVERY PLANS

Category	ENDANGERED			THREATENED			SPECIES* TOTAL	SPECIES HAVING PLANS
	U.S. Only	U.S. & Foreign	Foreign Only	U.S. Only	U.S. & Foreign	Foreign Only		
Mammals	25	20	242	4	0	22	313	23
Birds	60	16	141	3	2	0	222	54
Reptiles	8	6	60	8	4	13	99	21
Amphibians	5	0	8	3	0	0	16	6
Fishes	39	4	11	21	4	0	79	40
Snails	3	0	1	5	0	0	9	7
Clams	23	0	2	0	0	0	25	21
Crustaceans	3	0	0	1	0	0	4	1
Insects	8	0	0	5	0	0	13	12
Plants	96	6	1	24	3	2	132	46
TOTAL	270	52	466	74	13	37	912	231**

* Separate populations of a species, listed both as Endangered and Threatened, are tallied twice. Species which are thus accounted for are the gray wolf, bald eagle, American alligator, green sea turtle, Olive ridley sea turtle, leopard, and piping plover.

** More than one species may be covered by some plans, and a few species have more than one plan covering different parts of their ranges.

Number of Recovery Plans approved: 197

Number of species currently proposed for listing: 24 animals
42 plants

Number of Species with Critical Habitats determined: 96

Number of Cooperative Agreements signed with States: 47 fish & wildlife
26 plants

May 31, 1986

Reference Note

All Fish and Wildlife Service notices and proposed and final rules are published in the *Federal Register* in full detail. The parenthetical references given in the BULLETIN—for example: (F.R. 9/3/85)—identify the month, day, and year on which the relevant notice or rule appeared in the *Federal Register*.

Foreign Mailings

Some of our readers pass along extra copies of the BULLETIN to their colleagues in foreign countries. While this is fine, please note that the BULLETIN self-mailer works *only* for mailing to an address in the United States. When mailing to another country, the BULLETIN must be enclosed in an envelope or the U.S. Postal Service will not deliver it.

June 1986

Vol. XI No. 6

ENDANGERED SPECIES

Technical Bulletin

Department of Interior, U.S. Fish and Wildlife Service
Endangered Species Program, Washington, D.C. 20240

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SEP 2 1986

Audubon's Crested Caracara, One of Florida's Most Distinctive Raptors, Proposed for Listing

GOVT. PUBS.
DEPOSITORY 326

John L. Paradise
Jacksonville, Florida,
Endangered Species Field Station

The Florida population of Audubon's crested caracara (*Polyborus plancus audubonii*), one of America's most unusual birds of prey, was proposed for listing as a Threatened species on June 23, 1986. This bird, also known as the caracara eagle, the Mexican eagle, and the Mexican buzzard, is a large raptor measuring nearly 2 feet in total length with a wingspread of about 4 feet. It has yellow legs that are very long for a hawk, and a massive blue bill. There is a prominent yellow or orange colored bare skin patch between the eyes and the base of the beak. The common name "crested caracara" refers to the long feathers on the back of the head that form a crest.

Adult caracaras are mostly dark brown and black, but the lower parts of the head, throat, lower abdomen, and undertail coverts are white, sometimes tinged with yellow. The breast and upper back also are white, although heavily barred with black, and the tail is white with narrow dark crossbars and a broad, dark tip. A distinctive feature of the caracara in flight is a prominent white patch on the outer part of the wing at the base of the primary feathers. Juveniles are similar in color pattern to adults, but are brownish and buffy, with the breast and upper back streaked instead of barred.

There is no other American bird of prey like the caracara; it combines some of the characteristics of both hawks and vultures, feeding with equal relish on carrion and living prey. Its striking appearance makes it most desirable to bird watchers wherever it occurs.

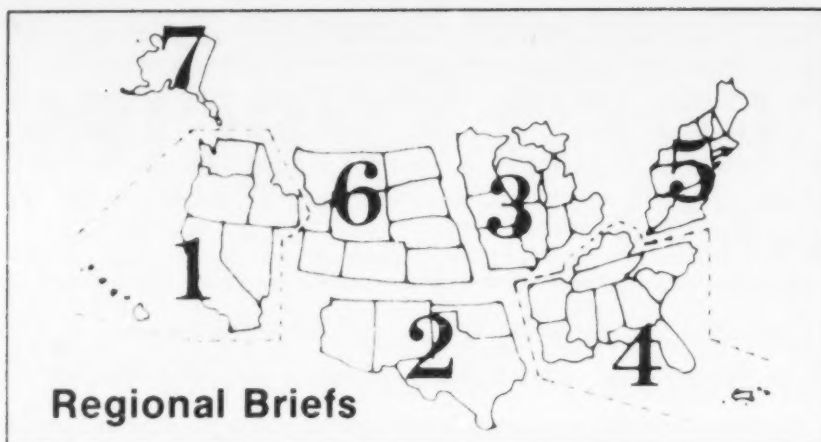
Caracaras as a group are found mostly in Central and South America. The crested caracara is the only species of this group that ranges into the United States. It occurs from Panama, north through Central America and Mexico, to extreme southern Arizona and Texas. Isolated populations are found in Cuba (including the Isle of Pines) and peninsular Florida. The crested caracara is the

(continued on page 4)



photo by John Waters, Jr. Florida Game and Fresh Water Fish Commission

Florida's crested caracaras were first discovered by John James Audubon in 1831, a time when the birds were common residents of the open grassland prairie region of central Florida.



Regional Briefs

Endangered Species Program regional staffers have reported the following activities for the month of June:

Region 1—The Boise, Idaho, Field Office reported that, during surveys for MacFarlane's four-o'clock (*Mirabilis*

macfarlanei) conducted in Idaho and Oregon, one of the largest populations (possibly the largest) of the plant was located. It was found close to the previously identified population near Tryon Bar on the Snake River.

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U.S. Fish and Wildlife Service Regions

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The Great Basin Complex at Reno, Nevada, reported that the cui-ui (*Chasmodon cujus*) run is over for this year. About 36,500 adults ascended the Truckee River. Larvae produced from this run began emerging from the gravel in early May, and peak emigration occurred in mid-May. Complex personnel will continue to monitor larvae numbers to determine whether the spawning run's success will produce a large year class through late July.

A brief status survey of Condor Canyon in southeastern Nevada, Critical Habitat for the Threatened Big Spring spinedace (*Lepidomeda mollispinis pratensis*), was conducted cooperatively with Nevada Department of Wildlife personnel. Spinedace were found in low numbers throughout the area except for one site where several hundred adults were present. Rainbow trout and crayfish, which are potential competitors, were recently introduced into the system, and many crayfish were collected in the latest survey. A site for a potential spinedace introduction was identified on Clover Creek. Information from the trip will be utilized in the recovery plan for the Big Spring spinedace now being prepared.

The Sacramento, California, Endangered Species Office (SESO) staff and a select group of lepidopterists reviewed the taxonomic status of the Santa Cruz County populations of *Euphilotes enoptes*. The general consensus of this review was that the Santa Cruz specimens represented a blend, or intergrade, between the Smith's blue butterfly (*E. e. smithi*) and the Tilden's blue butterfly (*E. e. tildenii*). On the basis of this new information, the county was advised that we now consider these butterflies to be an intergrade population that is not protected by the Endangered Species Act.

The County of Sacramento recently announced the purchase of approximately 430 acres of private land within the American River Parkway. Portions of the property contain habitat for the Threatened valley elderberry longhorn beetle (*Desmocerus californicus dimorphus*). Plans for the new acquisition include maintenance of existing habitats and reclamation of existing agricultural lands for the beetle's riparian habitat. Various local, State, and Federal funds were used to purchase the land.

The SESO, Environmental Protection Agency, San Mateo County Agricultural Commissioner, and San Mateo Farm Bureau reviewed the possible impacts to listed species by use of Mesurol (methiocarb) on artichokes for snail control. Because Mesurol is highly toxic to birds

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Endangered Classification Proposed for Southwestern Fish

The Virgin River chub (*Gila robusta seminuda*), once common, now is considered the rarest native fish in the Virgin River of southwest Utah, northwest Arizona, and southeast Nevada. Widespread modification of its unique habitat is responsible for the subspecies' serious decline in numbers and range. Further changes in its natural habitat, together with the potential spread of non-native species, threaten the chub's continued survival. To prevent its extinction, the Fish and Wildlife Service (FWS) has proposed listing this fish as Endangered (F.R. 6/24/86).

The Virgin River chub is adapted to swift waters that historically were naturally high in salinity, temperature, and turbidity, and that experienced fluctuating flows. These harsh environmental conditions probably account, at least in most part, for the fact that non-native predatory or competing fishes are not currently the problem in the Virgin River that they are in many other western river systems. Any actions that would alter these extreme water conditions could promote invasions of exotic species, further endangering the native fauna.

Since the mid-1800's, there has been an ever-increasing demand for development and use of the Virgin River and its tributaries. Five major water diversion structures built for irrigation and other agricultural uses now remove virtually all flows from long stretches of the Virgin River during summer. This severe

flow depletion has had obvious effects on the chub's habitat. Further, because Washington County, Utah, is experiencing a rapid increase in its human population, there will be a corresponding increase in demand for Virgin River water. Proposed desalinization projects and additional impoundments could further reduce the aquatic habitat or alter the water characteristics that now block the spread of harmful exotic fishes.

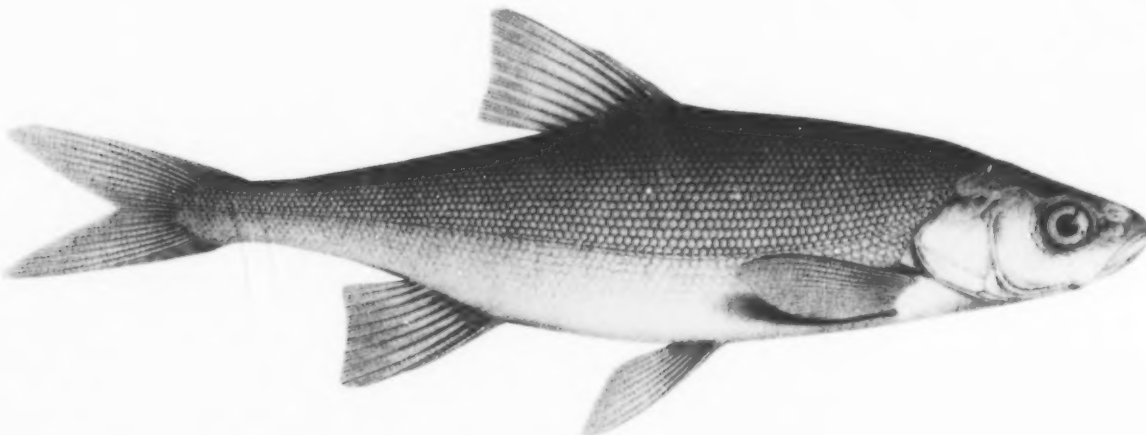
The only self-sustaining populations of the Virgin River chub known to survive are in 2 separate stretches of river totalling about 50 miles (80 kilometers). One occurs from a dam near Mesquite, Nevada, upstream to the southern end of the Virgin River Narrows. The second is found between the northern end of the Narrows and the Utah State Highway 9 bridge north of Hurricane, Utah. A provision to designate these 50 river miles as Critical Habitat was included in the proposed listing rule. Land along the occupied stretches is administered by the Bureau of Land Management (BLM), the States of Utah and Arizona, and private landowners. Several potential Bureau of Reclamation water development projects have been authorized for the Virgin River system, although they are not currently considered viable. In addition, the Soil Conservation Service (U.S. Department of Agriculture) has several projects proposed for the Virgin River basin in Utah. It is unknown at this time

whether or not any of these proposed projects would further jeopardize the chub.

If the proposal to list the Virgin River chub and designate its Critical Habitat is approved, this fish will receive the full protection authorized under the Endangered Species Act. Among the available conservation measures are prohibitions on taking and trafficking in listed species, a requirement for the FWS to develop and implement a recovery plan, and the possibility of Federal grants to State wildlife departments that have signed Endangered Species Cooperative Agreements with the FWS. Arizona, Nevada, and Utah all have such agreements for listed animals.

One of the most important benefits of the listing rule, if approved, would be the requirement under Section 7 of the Endangered Species Act for all Federal agencies to ensure that none of their activities are likely to jeopardize the Virgin River chub's survival or adversely modify its Critical Habitat. If any agency were to find that one of its planned activities may affect the chub, that agency would be required to consult with the FWS. The FWS would then work with the agency in an effort to accommodate its goals while ensuring the species' conservation.

Comments on the proposed rule are welcome, and should be sent to the Regional Director, Region 2 (address on BULLETIN page 2), by August 25, 1986.



The Virgin River chub, *Gila robusta seminuda*, is a silvery, medium-sized minnow generally less than 6 inches (15 centimeters) in total length.

Caracara

(continued from page 1)

national bird of Mexico, and is depicted on that country's seal and currency.

Although crested caracaras are strong fliers and can reach speeds of up to 40 miles per hour, they are more at home on the ground than most hawks and falcons. Their long legs and relatively flat claws make them well-adapted for walking and running. They spend a considerable amount of time perched on telephone poles, fence posts, or other high vantage points where they can watch for the insects, fish, frogs, turtles, birds and small mammals that comprise a large part of their diet. Caracaras are also particularly fond of turtle eggs.

Caracaras hunt both on the wing and on the ground. A pair will sometimes cooperate in killing larger animals, such as rabbits or egrets. Road kills comprise a large part of the caracara's diet, and birds may regularly patrol sections of highways searching for dead animals. Caracaras feed freely with vultures, the two species paying little attention to each other. When caracaras and vultures gather at a carcass to feed, the caracaras easily dominate the vultures despite their smaller size. Caracaras have even been seen driving bald eagles from road-killed animals.

A pair of adult caracaras maintains a large territory, and pair bonds are strong, persisting until one mate dies. Their nests, commonly placed 12 to 55 feet above the ground in the top of cabbage palmettos, are tough, bulky structures made of weeds, bushes, and vines piled in a heap and trampled down to form a depression. Caracara eggs, one to four per nest, most often are laid from January to March, but they have also been found during every month from September to April. Incubation usually lasts 32 to 33 days, and the young leave the nest about 2 months after hatching. The family group remains together for 2 to 3 months after the young fledge.

Threats to the Species

John James Audubon first discovered Florida's crested caracaras near St. Augustine (where the subspecies no longer occurs) in 1831. The bird formerly was common in the open grassland prairie region of central Florida, north to Brevard County and south to Fort Pierce, Lake Okeechobee, Rocky Lake (Hendry County), the Okaloosa Slough, and the Everglades (Collier County). All indications are that the range of the caracara in Florida has experienced a long-term contraction, with the birds rarely found today as far north as Orlando or on the east side of the St. Johns River. Currently, the region of greatest abundance is the five-



The crested caracara, also known as the Mexican eagle, is on that country's national seal.

county area of Glades, DeSoto, Highlands, Okeechobee, and Osceola, with lesser numbers occurring in Charlotte, Hardee, and Polk Counties. It is believed there may be only 150 active territories (300 adults) remaining in all of Florida, and there are probably only another 100 immature birds present in any given year.

The major cause of the caracara's decline in Florida is habitat loss. Available habitat has greatly decreased, and continues to decrease as native prairies and pasturelands are lost to real estate and agricultural developments. Although the Migratory Bird Treaty Act and Florida State laws offer some protection against taking the caracara, it is still being shot or trapped because of the erroneous belief that these birds are predators on newborn calves and because their large size and impressive appearance make them tempting targets for vandals. The increase in automobile traffic in areas of the caracara's habitat is another threat, most probably due to the caracara's predilection for feeding on or along roads.

Although the FWS believes that protection of the caracara is necessary to prevent its extinction, designation of Critical Habitat in this case would not be prudent. A determination of this kind would necessitate delineating the precise boundaries occupied by each pair of birds. Not only are data lacking for these delineations, but publication of habitat maps (required for a Critical Habitat designation) could further jeopardize the caracara's existence by point-

ing out exactly where the birds occur. The presence of large numbers of people could inadvertently interfere with the caracara's normal activities; precise locality data also would make the birds more vulnerable to vandals.

Even without a Critical Habitat designation listing the caracara under the Endangered Species Act would reinforce existing protection for the bird and add Section 7 protection for its habitat. The Act also would require the FWS to develop and implement a recovery plan.

The only known potential Federal activity that could be affected by this proposed listing is operation of the U.S. Air Force's Avon Park Bombing Range in Polk and Highlands Counties, an area that is part of the caracara's primary range. Although bombing range personnel recently reported no nesting pairs there at present, it is possible that caracaras may reside there at any time. With the publication of the proposed rule, the Air Force is now required to confer informally with the FWS if any of its bombing range activities are likely to jeopardize the caracara's survival. The FWS will work closely with the Air Force in an effort to help accommodate facility operations while avoiding further harm to the caracara.

Comments on the proposal to list the Florida population of Audubon's crested caracara are welcome, and should be sent to the U.S. Fish and Wildlife Service, Jacksonville Endangered Species Field Station, 2747 Art Museum Drive, Jacksonville, Florida 32207, by August 22, 1986.

Endangered Fish Recovery Activities in the Upper Colorado River Basin

John Hamill and Beth Hardy
FWS Denver Regional Office

Three fish species that inhabit the Upper Colorado River Basin are federally listed as Endangered—the Colorado squawfish (*Ptychocheilus lucius*), humpback chub (*Gila cypha*), and bonytail chub (*Gila elegans*). A fourth, the razorback sucker (*Xyrauchen texanus*), is not listed at this time but is a candidate for future listing.

The following interagency agreements have been developed in recent months between the Fish and Wildlife Service (FWS) and the Bureau of Reclamation (BR) for studies regarding these fishes of the Upper Basin:

1. Flaming Gorge Endangered Fish Operation Study

Since 1979, the BR and FWS have consulted on various projects, including the

operation of Flaming Gorge Dam in southeastern Wyoming and its effects on the Endangered fish species of the Green and Colorado River systems. The lack of specific information on these fishes in the late 1970's prompted establishment of the Colorado River Fishery Project, which was principally funded by the BR and conducted by the FWS.

Studies began in 1979 under various agreements between the BR and FWS. Early investigations were directed toward determining the species' distribution and water flow requirements, and obtaining enough information for the FWS to render sound Section 7 biological opinions on various BR projects. It is becoming increasingly apparent from the results that proper operation of Flaming Gorge Dam is critical to the survival of Endangered fish in the Green River system.

Further studies will look into the summer and fall requirements of Colo-

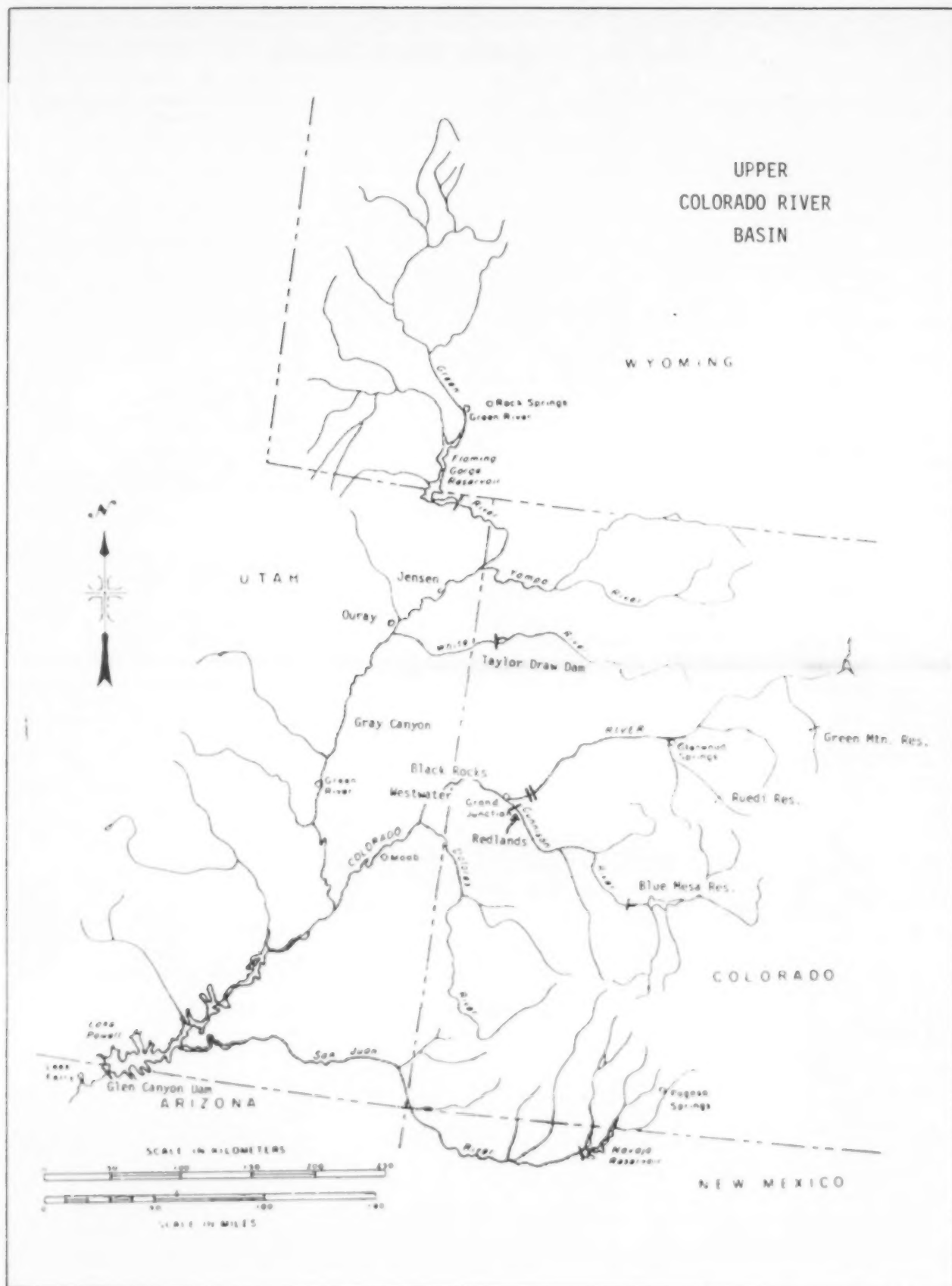
rado squawfish in the Green River with respect to spawning and survival of young-of-the-year fish; characterization of winter habitat and flows for adult and young Colorado squawfish and adult razorback suckers; spring to early summer flow requirements of Colorado squawfish, humpback chubs, and razorback suckers; fish community interactions (competition between native and non-native species); and trophic dynamics and ecological interactions of important backwater habitats in the Green River. Other studies on the Green River will focus on water temperatures; channel stability and sediment transport (as influenced by Flaming Gorge Dam) down to the confluence with the Colorado River; and remote sensing and mapping of important backwater habitats of Endangered fishes.

Once the necessary information is gathered, the FWS will develop a biolog-

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Endangered fish monitoring work on the Green River in Utah



Upper Colorado

(continued from page 5)

ical opinion on the continued operation of Flaming Gorge Dam by the BR. The opinion is scheduled to be issued in 1989.

2. Basinwide Monitoring and Research Agreement

The purpose of this agreement is to implement monitoring, research, and recovery activities for Endangered fishes throughout the Upper Basin. Necessary studies will be conducted by the FWS, BR, States of Colorado and Utah, and contractors. There are various timetables, but all of the work should be completed in 1988. Among the activities to be carried out under the agreement are:

2.a. Interagency standardized monitoring program—The objectives of this program include (1) determining the status and trends in Endangered fish populations in the Upper Basin; (2) determining relationships between physical and biological factors (e.g., flows, temperatures, non-native species, etc.) and the relative abundance of

Endangered fish; (3) ensuring that all data are properly collected and processed; and (4) monitoring the response of Endangered fish populations to different management and recovery measures. A handbook will be developed that defines standardized methods, sample designs, sampling sites, etc., for monitoring young-of-the-year Colorado squawfish, late juvenile/adult Colorado squawfish, and adult humpback chubs. The field program will be carried out by the Utah Division of Wildlife Resources and the Colorado Division of Wildlife.

2.b. Data analysis and management program—This program is designed to (1) compile and analyze existing FWS, State, and other data; (2) ensure that Endangered fish data are available for proper distribution; (3) establish a clearing house and data management support center; (4) provide basinwide and reach-specific summaries of the status and trends of various life stages of Endangered fishes; and (5) develop quantitative recovery goals for listed fishes in the Upper Basin. A data base management system handbook will be developed; an interagency monitoring data base and data base management system will be developed and main-

tained; habitat utilization curves for the Endangered fish will be refined and validated; and technical support will be provided to field staff in use of the data management system.

2.c. Design, construction, and evaluation of fish passage facility on the Gunnison River at Redlands—The objectives of this program are to reestablish use of the Gunnison River by Colorado squawfish and razorback suckers by (1) constructing a fish passage structure at the existing Redlands Diversion Dam on the Gunnison River in western Colorado; (2) evaluating the structure's effectiveness as a means of restoring the Colorado squawfish and razorback suckers upstream of the dam; and (3) augmenting Endangered fish populations at Redlands through stocking. During 1986, a feasibility study will be conducted by the U.S. Army Corps of Engineers to evaluate alternative fish passage structures for adult Colorado squawfish and razorback suckers.

2.d. Hydrology modeling of the Upper Colorado River Basin—One objective of this effort is to accurately model mean monthly flow conditions at sensitive habitat areas throughout the Upper Basin in various water years and under different water development conditions. Another goal is to accurately model the effects of different operating criteria for Flaming Gorge and the Wayne Aspinall Units at sensitive habitat areas on the Green, Gunnison, and Colorado Rivers.

2.e. Temperature information and modeling on the Colorado River—Biologists will develop methods of accurately assessing temperature conditions in sensitive habitat areas in the Upper Basin, evaluate thermal impacts of alternative water management scenarios on Endangered fishes, and recommend operating criteria on water projects for Section 7 and recovery efforts.

2.f. Instream flow data collection and analysis—This activity is designed to (1) develop quantitative relationships

(continued on page 12)



humpback chub

Listing Becomes Final for Southeastern Plant

Scutellaria montana, the large-flowered skullcap, is a herbaceous member of the mint family (Lamiaceae) that reaches 12 to 22 inches (30 to 55 centimeters) in height and has attractive blue and white flowers. Only 10 populations have been found, 7 in Georgia and 3 in Tennessee. Fewer than 7,000 of the plants are known to exist, and over 90 percent are concentrated at only two sites. Although portions of these two largest populations receive landowner protection, the species' survival in the face of continuing threats to its habitat

remains in question. A proposal by the FWS to list *S. montana* as Endangered was published November 13, 1985 (see summary in BULLETIN Vol. X No. 12), and the final listing was published June 20, 1986.

Under the Endangered Species Act, it is now illegal to engage in interstate or international trafficking in *S. montana*, except under permit. Other benefits include the requirement for the FWS to develop and implement a recovery plan, greater recognition of the species' precarious status, and the possibility of

Federal aid to States with approved Endangered Species Cooperative Agreements with the FWS under Section 6 of the Act. (Georgia, where the species' second largest population is found, is among those States with such an agreement for listed plants.) Under Section 7 of the Act, *S. montana* also will receive protection from any Federal activities that are likely to jeopardize its survival; fortunately, no such activities are foreseen.

Alligator Being Considered for Rangewide Reclassification

Wendell A. Neal
Jackson, Mississippi, Field Office

The FWS proposed June 2, 1986, to reclassify the American alligator (*Alligator mississippiensis*) where it now is categorized as Endangered or Threatened to the category of Threatened by Similarity of Appearance (T/SA). From a species-wide standpoint, the alligator is no longer in danger of extinction, nor is it likely to become so within the foreseeable future. Reclassification of this reptile to T/SA would formally recognize that this species has recovered, and allow some hunting while continuing certain trade controls designed to protect other, more vulnerable crocodilians.

Populations in most areas occupied by alligators (approximately 83 percent of this species' total range) already have been reclassified to T/SA in Florida, Louisiana, and Texas. The June 2 proposal would reclassify the remaining populations, scattered over parts of seven States (North Carolina, South Carolina, Georgia, Alabama, Arkansas, Mississippi, and Oklahoma), to T/SA. If the rule is made final, all populations of the American alligator would be classified as T/SA.

It is believed that this reclassification proposal will be the last in a long series of Federal rule changes under the Endangered Species Act affecting the American alligator. The alligator was

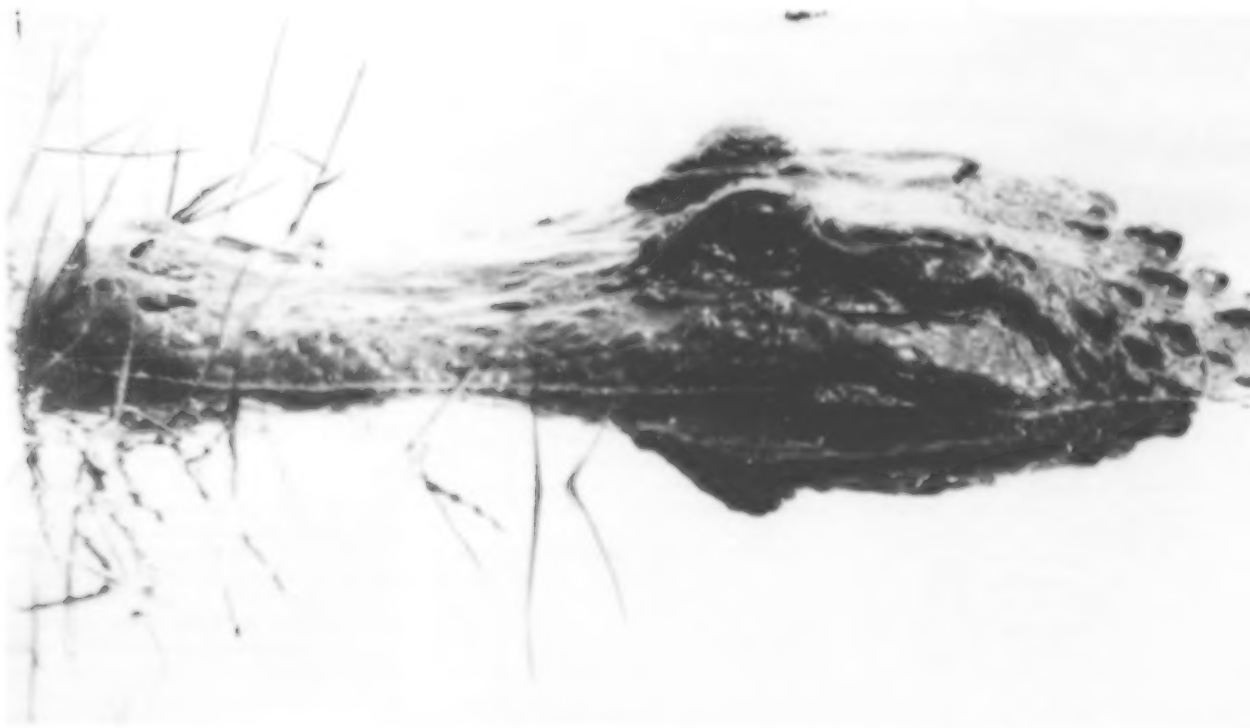
first classified in 1967 as Endangered due to concern over poorly regulated or unregulated exploitation for the hide industry. Under State and Federal protection, the alligator then began to recover in most parts of its range. By 1975, alligator populations in three Louisiana coastal parishes were large enough to be moved from the Endangered and Threatened classifications to the T/SA category. Alligator populations in all of Louisiana, Texas, and Florida later received the same T/SA classification.

Legal commercial hunting seasons for alligators are now held in these three States. Through initial harvesting programs, much has been learned about the effects of hunting on alligator populations. For example, past harvests of alligators were more often than not permitted without any realistic estimate of pre-harvest numbers or without any post-harvest monitoring to determine limits or restrictions needed to protect the main breeding group. Today, however, with data gathered in recent years by the Florida Game and Fresh Water Fish Commission and the Louisiana Department of Wildlife and Fisheries, we can establish some rough limits to hunting that will conserve wild alligator populations. With current knowledge and management techniques, past mistakes can be avoided, and overharvest should no longer be a threat.

Although the American alligator is no longer believed to be in danger of extinction, a number of other crocodilian species with hides of similar appearance remain very vulnerable. The category of T/SA, described in Section 4(e) of the Endangered Species Act, allows for Federal controls and monitoring in the trade of species thus classified in order to facilitate the protection of other species still listed as Endangered or Threatened.

The reclassification proposal, if approved, will remove the remaining 17 percent of the American alligator's range from habitat protection under Section 7 of the Endangered Species Act. Although wetlands within the species' range continue to be lost due to a variety of causes, such losses are not expected to significantly affect the overall alligator population. Further, Federal and State agencies manage and protect large amounts of alligator habitat. Over hunting, rather than habitat loss, was the main factor in the species' original decline.

Comments on the proposed reclassification are welcome, and should be sent to the Endangered Species Field Office, U.S. Fish and Wildlife Service, Jackson Mall Office Center, Suite 316, 300 Woodrow Wilson Avenue, Jackson, Mississippi 39213 by August 1, 1986.



Regional Briefs

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and aquatic animal species, no-spray zones were recommended near the habitats of the Santa Cruz long-toed salamander (*Ambystoma macrodactylum croceum*), San Francisco garter snake (*Thamnophis sirtalis tetrastenia*), and Smith's blue butterfly.

The Washington Department of Game, U.S. Forest Service (USFS), and National Park Service (NPS) will cooperatively search for active peregrine falcon (*Falco peregrinus*) eyries on the Baker-Snoqualmie National Forest and North Cascade National Park. FWS contributed \$3,000 to conduct surveys in western Washington, and the USFS and NPS each contributed \$800 to survey their lands. The USFS will also provide technical assistance to survey peregrine falcon nests in Olympia National Forest.

A proposed housing development and golf course at Clatsop Plains, Clatsop County, Oregon, could impact a primary breeding area for the Threatened Oregon silverspot butterfly (*Speyeria zerene hippolyta*). The FWS notified the county and the developer of the likelihood of an illegal take if the project should proceed. The FWS, the developer, and the county reviewed options and project modifications, and the developer is considering preparation of a Habitat Conservation Plan for a Section 10(a) permit.

Region 2—The Arizona bald eagle (*Haliaeetus leucocephalus*) population has completed its second most successful breeding season known. Sixteen territories were active, with 12 sites fledging a total of 17 young. Twenty-two young were fledged from 13 nests in 1985. A newly discovered nesting territory fledged one young. In addition, two chicks were moved from a nest prior to its flooding and were placed in a nest that had failed to hatch its eggs. Both of the transferred chicks fledged successfully.

Thirty Endangered thick-billed parrots (*Rhynchopsitta pachyrhyncha*) were confiscated by FWS law enforcement agents after the parrots were illegally imported from Mexico. These birds, and another 10-15 thick-billed parrot chicks produced in captivity by various zoos and private breeders, are being considered for reintroduction into the wild. The Arizona Game and Fish Department, U.S. Forest Service, and FWS are cooperatively planning to reintroduce the birds into part of the species' former range in the mountains of southeastern Arizona this fall.

A male whooping crane (*Grus americana*) that was found dead in Canada's Wood Buffalo National Park in late May was necropsied by veterinarians at the University of Saskatchewan. Small spots of dead muscle were present on the bird's heart. Presumably the 8-year-old whooper died from cardiac arrest. Efforts are under way to determine the cause of the dead muscle.

Dr. James Lewis, FWS Whooping Crane Coordinator, met with the National Wildlife Health Laboratory staff to discuss the avian tuberculosis that infected three whooping cranes in the Rocky Mountain population last spring.

Of the 15 whooping crane eggs transferred to Grays Lake National Wildlife Refuge (NWR) in late May, eleven hatched, two were eaten by predators, and two were infertile. Of the four eggs transferred to Patuxent Wildlife Research Center in Maryland, two hatched and two died during embryo development.

On June 26, an adult female whooping crane was captured in western Wyoming. The bird, flightless due to the annual molt, was transported to Grays Lake NWR and released in the vicinity of two adult males. A second female will probably be moved to Grays Lake within the next few weeks. These transfers are designed to increase the opportunity for male-female associations that may eventually lead to pair bonds.

A meeting was held at the White Sands Missile Range in New Mexico to discuss drafting a management plan for the White Sands pupfish (*Cyprinodon tularosa*), a Category-2 listing candidate. The species is of interest to the FWS because it occurs only in three locations on the missile range and at one location on Holloman Air Force Base. Loss of any of the populations could seriously affect the survival of the species in its natural habitat; however, successful implementation of a management plan could provide protection for the species and its habitat.

There is great concern that the 1986 Attwater's greater prairie chicken (*Tympanuchus cupido attwateri*) hatch may have been lost to the heavy rains that fell on the Attwater Prairie Chicken NWR in Texas between May 30 and June 18. At varied times, water flowed across the refuge prairie and roads. Refuge brood surveys will be conducted during July to determine the extent of damage to the hatch. The hatching success of the Attwater's prairie chickens along the Texas coast may also have been affected by recent heavy rains in that area.

The 1986 Attwater's prairie chicken population of 874 is down 39 percent from 1985. Biologists believe that the decline is largely due to the heavy rains

that occurred during the 1985 hatching period in the southern populations of Goliad, Refugio, and Victoria Counties, Texas. Habitat destruction has also contributed to this decline.

The Attwater's Prairie Chicken Recovery Plan recommends that a second wildlife refuge be established to help preserve this species. Planning is under way to develop a 15,000-acre refuge in Victoria County that would be operated as a satellite of the Attwater Prairie Chicken NWR.

Region 3—Landowner contacts continue by The Nature Conservancy on the "Driftless Area Project" in northeast Iowa. This is a joint effort by the FWS, The Nature Conservancy, and the Iowa Conservation Commission to protect alluvial slopes (areas with year-round frozen subsoil) containing the Endangered Iowa Pleistocene snail (*Discus macclintocki*) and Threatened northern wild monkshood (*Aconitum noveboracense*). The owners of 23 land parcels are to be contacted; so far, 17 have registered under the Conservancy's registry program. Registration is a voluntary commitment by a landowner to protect the alluvial slopes and is viewed as an interim measure until permanent protection is obtained. The excellent response to registration indicates an awareness and concern by the local citizens for resource protection.

On June 5, the Gray Wolf Recovery Team met in the Regional Office to discuss the Wisconsin Wolf Recovery Plan, road densities, management on the Superior National Forest, and effects of developing snowmobile trails on wolves.

The research project on the Kirtland's warbler (*Dendroica kirtlandii*) has been redirected from the winter work in the Bahama Islands to Michigan, specifically the Mack Lake burn area. The work in the Bahamas to date indicates that the birds are widely distributed with no apparent habitat problems.

The warbler census has been completed in Michigan. Two hundred ten singing males were found this year including 14 on the Mack Lake area. No birds have been found in Ontario yet. Last year's census indicated 215 singing males, plus one in Ontario.

A meeting to discuss the extent and causes of a freshwater mussel die-off was held recently in Davenport, Iowa, with about 75 attendees from a broad range of State and Federal agencies. While reports on a number of "die-offs" were presented, there still are no clear data proving the occurrence of a widespread die-off from a single cause. Possible causes were discussed, as well as

(continued on next page)

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the type of study needed to identify a die-off and to identify the cause(s).

Region 4—Numerous arrests have been made in Georgia and South Carolina for the illegal commercialization of wildlife. In Georgia, a 20-month investigation, Operation PISCES, covered 27 counties and was conducted by conservation rangers from the State Department of Natural Resources and FWS law enforcement special agents. The undercover agents set up a storefront business to infiltrate the illegal market. More than 500 pounds of alligator meat, 2,000 pounds of deer meat, 2,500 pounds of raccoon meat, and 1,000 pounds of fish, including the Endangered shortnose sturgeon (*Acipenser brevirostrum*), were bought and sold during the operation. The gourmet food market supplied all of the business demand. Persons charged with the illegal sale of wildlife

may have been involved in interstate, intrastate, or even foreign commerce.

In South Carolina, 70 people were arrested in May for the illegal commercialization of deer, fish, gamebirds, and fur. State warrants and Federal indictments, involving 300 counts of conservation law violations, were served as a result of an undercover crackdown involving special agents of the South Carolina Wildlife and Marine Resources Department and the FWS.

The Jacksonville, Florida, Endangered Species Field Station staff has been involved over the last several weeks in the review of a red-cockaded woodpecker (*Picoides borealis*) management plan for a large tract of land near Orlando where the Martin Marietta Aerospace Corporation is proposing to develop an electro-optical test range. As a result of an Endangered species survey, six red-cockaded woodpecker colonies were found. Developing the test range will necessitate some tree removal, which will affect the foraging habitats of several colonies. The consultant has

prepared a management plan for the remaining area in order to enhance the survival of the clans impacted by this development.

Working with the applicant, the FWS also recommended some modifications in the design of the test range to accommodate the birds. The management plan calls for prescribed burning and some timber harvesting to open habitat that may not be useable by the birds at the present time. Up to several years ago, it was thought that there were very few red-cockaded woodpeckers remaining in Orange County. However, as private lands are being developed and wildlife surveys are being conducted, active clans are being located.

A significant tract of Florida land supporting pine rockland vegetation, a vanishing biological community, has come into public ownership in the Miami area. The Deering Estate, a 347-acre tract south of Coral Gables, contains about 75 acres of pine rocklands. A federally Endangered plant, *Euphorbia deltoidea* (continued on next page)



Operation PISCES uncovered widespread illegal trade in certain species of wildlife, including the Endangered shortnose sturgeon.

Regional Briefs

(continued from previous page)

var. *deltoidea*, occurs on the site. The property was purchased through the State's Conservation and Recreational Lands Program and will be managed by the Metropolitan Dade County Parks and Recreation Department, which is currently negotiating a management plan with the Florida Department of Natural Resources.

A hydrology study, funded by Waste Management of North America, Inc., of the area near Key Cave (Alabama) was recently completed. The study was conducted to determine if a proposed solid waste landfill site fell within the recharge area for Key Cave. This cave contains the only known population of the Threatened Alabama cavefish (*Speoplatyrhinus poulsoni*).

The hydrologic investigation recommended that the proposed landfill site not be used for solid waste due to the risk to Alabama cavefish. Based on this report, Waste Management withdrew its permit application. A copy of the hydrologic report was provided to the Endangered Species Field Station at Jackson, Mississippi, and will be very beneficial in future efforts to protect and recover this species.

Region 7—Biological surveys are once again under way on Kiska Island in the Aleutians where this spring the toxicant Compound 1080 was used to try to rid the island of introduced arctic foxes (*Alopex lagopus*). This action is necessary to benefit the Endangered Aleutian Canada goose (*Branta canadensis leucopareia*), which once was an abundant breeding bird on the island.

Although only a small section of Kiska has been surveyed to date, no foxes or fox signs were evident. A survey for bald eagles, conducted by circumnavigating the island by vessel, revealed that eagle numbers were virtually identical to those recorded last summer prior to the treatment. Survey efforts on other non-target wildlife species are continuing. Biologists were also pleasantly surprised to observe 16 Aleutian geese on the island. Although the birds appear to be non-breeders, they may be the vanguard of a future breeding population.

Region 8 (Research)—Two FWS research and development scientists, Richard C. Banks and Paul A. Opler, recently participated in a review panel for the bay checkerspot butterfly (*Euphydryas editha bayensis*). Opler, Chief of the Office of Information Transfer's Editorial Section, chaired the panel, which was asked to evaluate the taxonomic status and distribution of the butterfly. The panel concluded that the bay checkerspot is, in fact, a valid sub-

species that previously had been present in four California counties, and is now extirpated in two. Banks and Opler, together with two other FWS biologists, Michael Bentzien and Steven Chambers, received a special group award for their part in the panel.

On May 31, the Maui, Hawaii, Field Station staff of the Patuxent Wildlife Research Center (PWRC), made the first observation of fledging of the po'o uli (*Melamprosops phaeosoma*), an endangered Hawaiian forest bird. One young fledged from the nest, located in the Hanawi watershed on Maui, and did not return to it. Observations of this nest, first discovered in March, represent the only information to date on the po'o uli. On June 1, the young bird was observed with its parent 30 meters from the nest site.

A Mississippi sandhill crane (*Grus canadensis pulla*) chick, taken as an egg from the wild on May 8, hatched five days later at PWRC in Maryland. As part of a research study, the chick is being reared under a mounted Florida sandhill crane (*G. c. pratensis*) brooder model and fed with a mounted crane head.

On May 21, a Mississippi sandhill crane egg produced by the PWRC captive-propagation flock was transported to the Mississippi Sandhill Crane National Wildlife Refuge near Gautier, Mississippi. It was immediately introduced into a wild nest where two eggs had failed to hatch. Refuge personnel reported that the translocated egg hatched on May 28.

A key member of the wild Puerto Rican parrot (*Amazona vittata*) population, an adult male, has not been sighted since mid-May, and researchers at the Puerto Rico Endangered Species Field Station fear that he is dead. This parrot was a member of the nesting pair that produced two clutches this year containing a total of seven eggs; six of these eggs hatched. Biologists continue to search for the missing parrot.

Currently, the wild population of the Puerto Rican parrot consists of a minimum of 28 birds, including 6 chicks in nests. The captive population at the Puerto Rico Field Station aviary includes 29 adult parrots, 6 chicks taken from natural nests in the wild, and 3 captive-produced chicks.

Eighteen wild-caught masked bobwhites (*Colinus virginianus ridgwayi*) from Mexico were released recently from the U.S. Department of Agriculture quarantine facility in New York and transferred to PWRC. These birds will be useful in increasing the genetic diversity of the captive masked bobwhite flock.

National Forum on BioDiversity

The National Academy of Sciences and the Smithsonian Institution will sponsor a National Forum on BioDiversity on September 21-24, 1986, in Washington, D.C. This forum will carefully examine the issue on a worldwide basis through a series of panel sessions, roundtable discussions, films, and lectures. Concurrent with the forum, the Smithsonian National Associates Lecture and Seminar Program will present an in-depth seminar on biological diversity during September 21-27. In addition to the forum events, seminar activities will include guided tours of the National Museum of Natural History and field trips to several Smithsonian research and conservation facilities. Both the forum and seminar are designed to provide participants with a better understanding of the severity and consequences of the destruction of the earth's natural environments. For a more detailed description of the programs, contact the National Forum on BioDiversity, Directorate of International Activities (SI 302), Smithsonian Institution, Washington, D.C. 20560. Advanced registration is highly recommended.

Reference Note

All Fish and Wildlife Service notices and proposed and final rules are published in the *Federal Register* in full detail. The parenthetical references given in the BULLETIN—for example: (F.R. 9/3/85)—identify the month, day, and year on which the relevant notice or rule appeared in the *Federal Register*.

BULLETIN Available by Subscription

Although we would like to send the BULLETIN to everyone interested in endangered species, budgetary constraints make it necessary for us to limit general distribution to Federal and State agencies and official contacts of the Endangered Species Program. However, the BULLETIN is being reprinted and distributed to all others, on a non-profit subscription basis, by the University of Michigan. To subscribe, write to the *Endangered Species Technical Bulletin Reprint*, School of Natural Resources, University of Michigan, Ann Arbor, Michigan 48109-1115, or telephone 313 763-1312. The price for 12 monthly issues is \$12.00 (in Canada, \$17.00).

Upper Colorado

(continued from page 7)

between flow and important habitats for Endangered fishes at sensitive habitat sites in the Upper Basin; and (2) relate changes in flow/habitat to changes in fish populations.

2. g. System maintenance, design, and software integration—The objectives include: (1) maintaining and providing user support for an efficient computer file management/archiving system; and (2) ensuring that the system is being used efficiently by all Upper Basin users.

3. Ruedi/Green Mountain Conservation Measures

A third agreement with the BR's Missouri River Region provides funding for the FWS to evaluate the feasibility of artificially spawning and rearing young Colorado squawfish in "grow-out" ponds adjacent to the Colorado River near Grand Junction, Colorado.

Studies by the FWS suggest that temperature may be an important factor limiting the growth of Colorado squawfish in the Upper Basin. Slow growth extends the period when young squawfish are vulnerable to predators and other dangers. Gravel-pit ponds in the Grand Valley area warm earlier in the year, and stay warm longer than does the adjacent Colorado River. This longer growing season, combined with the abundance of food planned for stocking in these ponds, should result in Colorado squawfish growth rates 4 or 5 times faster than those of squawfish in the river.

Adult Colorado squawfish will be captured during spawning surveys and the females brought into ripeness using hormone injections. Next, their eggs will be stripped and dried locally, then transported to Hotchkiss National Fish Hatchery for incubation, hatching, and

BOX SCORE OF LISTINGS/RECOVERY PLANS

Category	ENDANGERED			THREATENED			SPECIES* TOTAL	SPECIES HAVING PLANS
	U.S. Only	U.S. & Foreign	Foreign Only	U.S. Only	U.S. & Foreign	Foreign Only		
Mammals	25	20	242	4	0	22	313	23
Birds	60	16	141	3	2	0	222	54
Reptiles	8	6	60	8	4	13	99	21
Amphibians	5	0	8	3	0	0	16	6
Fishes	39	4	11	21	4	0	79	40
Snails	3	0	1	5	0	0	9	7
Clams	23	0	2	0	0	0	25	21
Crustaceans	3	0	0	1	0	0	4	1
Insects	8	0	0	5	0	0	13	12
Plants	97	6	1	24	3	2	133	46
TOTAL	271	52	466	74	13	37	913	231**

* Separate populations of a species, listed both as Endangered and Threatened, are tallied twice. Species which are thus accounted for are the gray wolf, bald eagle, American alligator, green sea turtle, Olive ridley sea turtle, leopard, and piping plover.

** More than one species may be covered by some plans, and a few species have more than one plan covering different parts of their ranges.

Number of Recovery Plans approved: 197

Number of species currently proposed for listing: 26 animals
42 plants

Number of Species with Critical Habitats determined: 96

Number of Cooperative Agreements signed with States: 47 fish & wildlife
26 plants

June 30, 1986

early growth. The resulting fry, or other fry from Dexter National Fish Hatchery (if needed), will be stocked into ponds from which undesirable species have been removed. Growth and survival of the squawfish will be monitored, as will basic water chemistry and the status of the stocked forage-fish community. Fish produced will be used in high priority research areas, such as the Gunnison River, as part of the evaluation program for the proposed Redlands fish-passage structure.

This work plan is the first part of a three-phase effort to evaluate the potential for producing squawfish in grow-out ponds. Phase one will evaluate the feasi-

bility of using the ponds for fish production and maintenance of broodstock, the second involves overall production capability, and the third concerns evaluating the use of squawfish raised in grow-out ponds as an aid in augmenting and/or restoring the species in its natural river habitat.

For further information on any of the Upper Colorado River Basin fish recovery activities, contact John Hamill, Colorado River Endangered Species Recovery Coordinator, in the FWS Region 6 Endangered Species Office at (303) 236-7398 or FTS 776-7398. (See address on BULLETIN page 2.)

July 1986

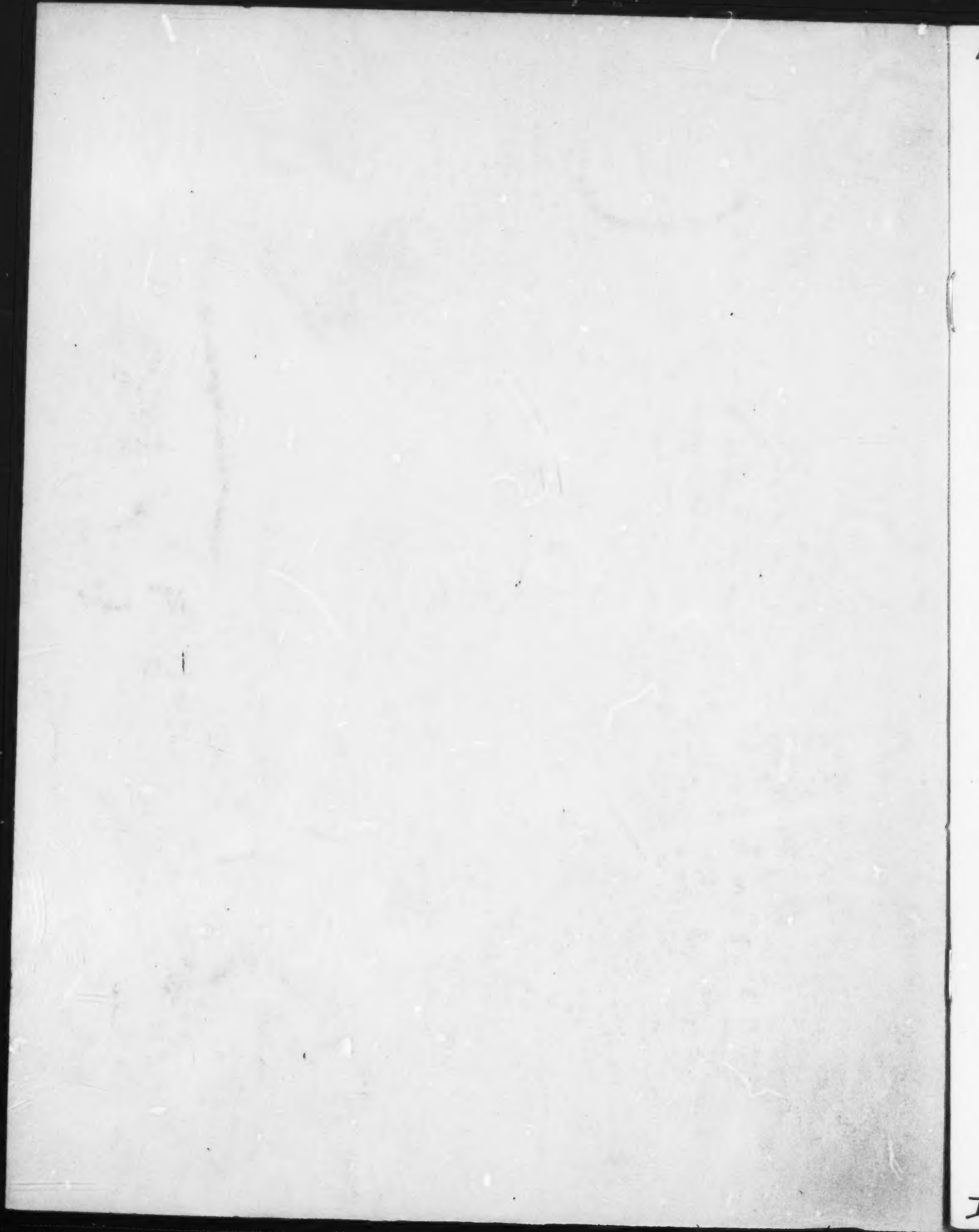
Vol. XI No. 7

ENDANGERED SPECIES

Technical Bulletin

Department of Interior U.S. Fish and Wildlife Service
Endangered Species Program Washington, D.C. 20240

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Three Southeastern Animals Proposed for Listing

Three rare taxa found only in the southeastern United States—a freshwater turtle, a tortoise, and a fish—were proposed by the Fish and Wildlife Service (FWS) during July 1986 for listing as Threatened or Endangered. The primary threat to all three is habitat depletion or loss, although the two reptiles also are vulnerable to collecting and predation. If the listing proposals later become final, the protection authorized by the Endangered Species Act will be extended to the following:

Alabama Red-Bellied Turtle (*Pseudemys alabamensis*)

This herbivorous freshwater turtle is restricted to the lower floodplain of the Mobile River system in Baldwin and Mobile Counties, Alabama. It is a fairly large species, having an 8-10 inch (20-25 cm) carapace that is brown to olive in color, with yellow, orange, or reddish streaks and mottling that form distinct, vertical bars. Its skin is olive to black with yellow to light-orange stripes. Characteristics most useful in distinguishing this species from other members of its genus in the Southeast include the number and configuration of stripes on the head and arching of the shell.

The Alabama red-bellied turtle once was found as far north as Little River State Park in Monroe County, but it now occurs only as far north as the Mobile River below David Lake. Its principal habitat consists of dense beds of aquatic vegetation, which provide the turtle with food and substrate for basking and predator avoidance. There is only one known nesting area receiving repeated annual use, an island spoil bank bordered on

(continued on page 3)

Editor's Note

For budgetary reasons, BULLETIN Vol. XI Nos. 8 and 9 were delayed. They are combined in this edition.

Red Wolf Proposed for Reintroduction

The Fish and Wildlife Service (FWS) proposed July 24, 1986, to reintroduce mated pairs of red wolves (*Canis rufus*), an Endangered species, into the Alligator River National Wildlife Refuge in Dare and Tyrrell Counties, North Carolina, and to classify this population as a "nonessential experimental population" under Section 10(j) of the Endangered Species Act of 1973 (ESA). The red wolf has been extirpated from its entire historical range in the southeastern United States and exists only in captivity.

Experimental status is being proposed because it authorizes more management flexibility than is allowed for a regularly listed species. This provision is a critical factor in gaining support from other agencies and the public for the proposed reintroduction. An experimental population is treated as a Threatened species for purposes of Sections 4(d) and 9 of the ESA, which prohibit certain activities involving listed species.

The designation of nonessential was proposed because the red wolf is fully protected in captivity at seven different locations, and all animals released into the wild can be quickly replaced through captive breeding. When not on a National Wildlife Refuge or National Park, a nonessential experimental population is treated as a species *proposed* for listing, rather than as a listed species, for purposes of Section 7 of the ESA (except for Section 7(a)(1), which applies to all experimental populations). However, if the experimental population is located on a National Wildlife Refuge or National Park, the full protection of Section 7 applies. No conflicts are envisioned between reintroduced red wolves and any Federal actions or traditional public uses of the refuge or surrounding lands.

A special rule specifying circumstances under which take of reintroduced red wolves would be allowed was proposed

(continued on page 7)



photo by Steven Schremp

The red wolf, now extinct in the wild, has been proposed for reintroduction into an area of North Carolina within its former range.



Regional News

Endangered Species Program regional staffers have reported the following activities for the months of July and August:

Region 1—The Sacramento Endangered Species Office (SESO) verified a report by Robert Edminster, a Merced

(California) Junior College teacher, of delta coyote-thistle (*Eryngium racemosum*) occurring along the San Joaquin River. Four populations also were confirmed east of Kesterson National Wildlife Refuge (NWR). This plant is currently a Category-1 candidate for a future listing proposal.

U.S. Fish and Wildlife Service Washington, D.C. 20240

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U.S. Fish and Wildlife Service Regions

Region 1: California, Hawaii, Idaho, Nevada, Oregon, Washington, and Pacific Trust Territories. **Region 2:** Arizona, New Mexico, Oklahoma, and Texas. **Region 3:** Illinois, Indiana, Iowa, Michigan, Minnesota, Missouri, Ohio, and Wisconsin. **Region 4:** Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, South Carolina, Tennessee, Puerto Rico, and the Virgin Islands. **Region 5:** Connecticut, Delaware, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, Vermont, Virginia, and West Virginia. **Region 6:** Colorado, Kansas, Montana, Nebraska, North Dakota, South Dakota, Utah, and Wyoming. **Region 7:** Alaska.

The ENDANGERED SPECIES TECHNICAL BULLETIN is published monthly by the U.S. Fish and Wildlife Service, Department of the Interior, Washington, D.C. 20240.

In response to the request of local developers, conservationists, and government officials, the Marina Coastal Zone Planning Task Force expressed an interest in preparing a Habitat Conservation Plan for coastal dune populations of the Endangered Smith's blue butterfly (*Euphilotes enoptes smithi*). The SESO has provided preliminary information about the procedures, time frames, technical requirements, costs, and other matters related to development of such conservation plans.

A very small population of the Travertine band-thigh diving beetle (*Hygrotus fontinalis*), a Category-2 listing candidate, was found in one pool of the Travertine Hot Springs in Mono County, California. The springs are being modified by recreational activities.

The FWS Laguna Niguel, California, Field Office investigated two more unauthorized fills in San Diego County. One involved clearing of riparian habitat that contained the nest of a least Bell's vireo (*Vireo bellii pusillus*), which occurred within proposed Critical Habitat for the species. Although a final rule was published on May 2, 1986, listing the vireo as Endangered, a decision on the designation of Critical Habitat has been postponed until May 3, 1987 (see BULLETIN Vol. XI No. 6). Both of these suspected illegal activities were reported to the Los Angeles District of the U.S. Army Corps of Engineers.

A cooperative survey of the Mariana fruit bat (*Pteropus mariannus mariannus*) on Ulithi Atoll and the islands of Yap, Gagil-Tamil, and Maap in Yap State (Federated States of Micronesia) was conducted to determine the status of the species there. The survey showed that these fruit bat populations are at the carrying capacities of their habitat. Pressure has been mounting in Yap State to abolish current restrictions on taking of fruit bats to supply export markets on Guam and Saipan. The fruit bat on Guam is Endangered, and the populations on the islands of Saipan, Tinian and Rota have been petitioned for listing as Endangered due to excessive taking for human consumption. The results and recommendations for management of this species were transmitted to the Governor of Yap State at his request. The Yap Government and the FWS are concerned that lifting the ban on taking fruit bats would have serious effects on the species.

The existing ban was prompted by drastic population declines resulting from excessive taking to supply fruit bats for the markets on Guam and Saipan. They were sold for \$20-25 each. The moratorium on taking has enabled the fruit

(continued on page 7)

Final Section 7 Regulations Approved

Nancy Sweeney
Endangered Species Office, Washington

On June 3, 1986, the Departments of Commerce and the Interior published joint final Interagency Cooperation Regulations implementing Section 7 of the Endangered Species Act (ESA). The previous Section 7 final regulations were published on January 4, 1978. Subsequently, the ESA was amended in 1978, 1979, and 1982. Proposed regulations that incorporated the changes mandated by the amendments were published on June 29, 1983. Numerous comments on the draft regulations were received from Federal, State, and local governments; industry; environmental groups; and private citizens.

Section 7 of the ESA requires Federal agencies, in consultation with and with the assistance of the Secretaries of Commerce and/or Interior, to ensure that any action they authorize, fund, or carry out is not likely to jeopardize the continued existence of a Threatened or Endangered species or result in the destruction or adverse modification of designated Critical Habitat. The consultation responsibilities have been delegated to the National Marine Fisheries Service for the Department of Commerce and to the Fish and Wildlife Service for the Department of the Interior.

The 1978 Amendments made four major changes in the previous consultation process. The first was the requirement that a biological assessment be conducted for certain actions. The new final regulations have limited this requirement

to major construction activities. The second change was that consultation is to be concluded within 90 days after initiation of consultation instead of 60 days; further, if the Service involved issues a biological opinion of jeopardy or adverse modification, it must include reasonable and prudent alternatives to the action, if any can be developed. The third change prohibits the Federal agency and the permit or license applicant, once consultation is initiated, from making any irreversible or irretrievable commitment of resources that would preclude the adoption of any reasonable and prudent alternatives. The fourth change was the creation of the exemption process. Through a Review Board and Endangered Species Committee, a Federal agency or permit applicant may seek an exemption to Section 7's requirement to ensure no jeopardy or adverse modification.

The 1979 Amendments added a provision whereby a Federal agency that has an action that is likely to jeopardize the continued existence of a *proposed* species or result in the destruction or adverse modification of *proposed* Critical Habitat is required to "confer" with the appropriate Service. The results of such conferences are non-binding.

The 1982 Amendments also made four major changes in the consultation process. Early consultation was the first addition. If a project requires a Federal permit or license and the applicant has reason to believe the action may affect

listed species or Critical Habitat, it may request the authorizing Federal agency to initiate early consultation with the Service involved on its behalf. This consultation takes place prior to the submission of the application for the Federal permit or license. The second change under the 1982 Amendments is the involvement of the permit or license applicant in granting time extensions for the completion of biological assessments and biological opinions. The third provision allows for the issuance of an "incidental take" statement along with the biological opinion. Such a statement exempts the Federal agency and any permit or license applicant involved from Section 9 "taking" prohibitions under the Act, if the action is implemented consistent with the terms and conditions included in the incidental take statement. The last change of the 1982 Amendments was the streamlining of the exemption process. The exemption Review Board was replaced by the Secretary of the Interior and the overall timeframe for completion of the process was shortened from 360 to 190 days.

The above changes were mandated by amendments to the Act. However, other changes are included in the final regulations in response to the comments received over the course of time and actually working with the consultation process. For more information, refer to the regulations as published in the June 3, 1986, *Federal Register*, Part II.

Three Animals

(continued from page 1)

one side by a wooded swamp. The turtle's survival is threatened at this location by a high incidence of egg predation and human disturbance.

Heavy recreational use of the turtle's nesting habitat (a beach) by campers during times when turtles are nesting apparently reduces their reproductive success. Three-wheeled vehicles have been observed uncovering nests, resulting in dehydration and breakage of the eggs. These consistent disturbances to the turtle's nesting habitat seem to have affected its overall population, although the total current population size is not known. The remainder of the Alabama red-bellied turtle's habitat, the marshes and bays of the lower part of the Mobile River system, are not as disturbed as the nesting island; however, natural phenomena, such as movement of saltwater wedges up into bays of the lower Mobile Bay area during hurricanes, have probably caused the reductions in aquatic vegeta-

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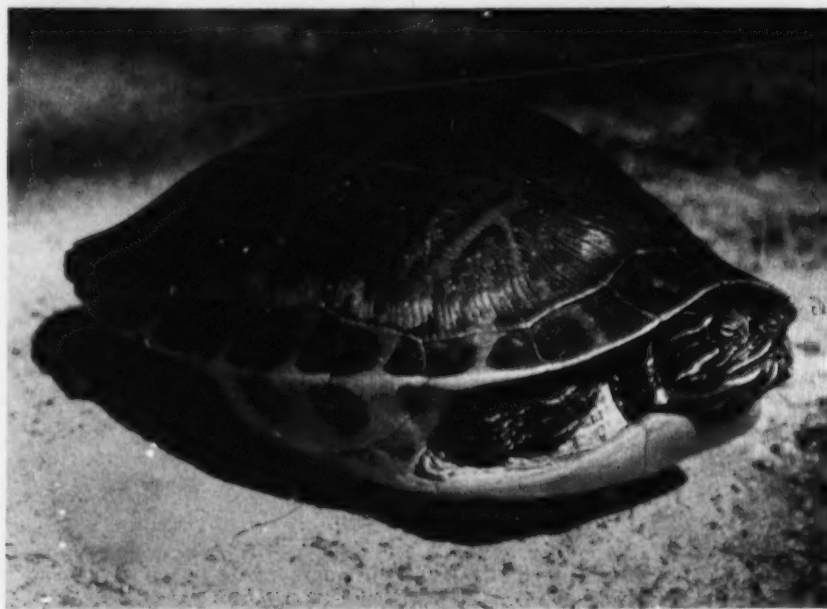


photo by Robert H. Mount

The Alabama red-bellied turtle's survival is threatened at its one known nesting location by a high incidence of egg predation and human disturbance.

Three Animals

(continued from page 3)

tion, which is necessary during part of the turtle's life-cycle.

The alligator is probably a frequent predator of hatchling and juvenile red-bellied turtles as evidenced by the high incidence of tooth scars found on the shells. Domestic pigs, released onto the nesting island during the late 1960's, have been known to follow the turtles from the water to their nest sites, where the pigs have eaten turtle eggs during and subsequent to laying. Fish crow (*Corvus ossifragus*) predation on turtle eggs also is threatening nesting success.

In addition to the predation problems and the physical disturbance to the nesting area, Alabama red-bellied turtles are incidentally harvested by commercial fishermen and shrimpers in gill, hoop, and trammel nets, and crab traps. Some of the turtles have also been trapped and then sold as pets or food. Such taking of

the species greatly increases its already precarious status.

Because of the Alabama red-bellied turtle's restricted range, apparent scarcity, low population recruitment, and the other factors threatening its survival, the FWS proposed on July 8, 1986, to list this species as Threatened. The proposal does not include a Critical Habitat designation for the species, mostly because the required publication of maps and other publicity accompanying such a designation could greatly increase the collecting pressure already threatening the turtle. Identifying the sole known nesting area, which is on private property, could be detrimental to the species' survival. Nevertheless, even without a formal designation of Critical Habitat, Section 7 of the Endangered Species Act will still provide protection against destruction of the Alabama red-bellied turtle's habitat by Federal activities if the listing proposal is made final. Federal involvement may include U.S. Army Corps of Engineers' per-

mit activities; however, no major conflicts are foreseen at this time.

Gopher Tortoise (*Gopherus polyphemus*)

The gopher tortoise is a large, dark-brown to grayish-black terrestrial turtle with elephantine hindfeet and shovel-like forefeet. It lives most often on well-drained, sandy soils in forest and grassy areas, ranging along the coastal plain from South Carolina through Florida to southeastern Louisiana. The western population of the gopher tortoise occurs from the Tombigbee and Mobile Rivers in Alabama to southeastern Louisiana, but its distribution within this region is now fragmented and spotty. Conversion of the gopher tortoise's habitat to urban areas, croplands, and pasturelands, along with the effects of certain forest management practices, has reduced habitat in the western portion of the species' historical

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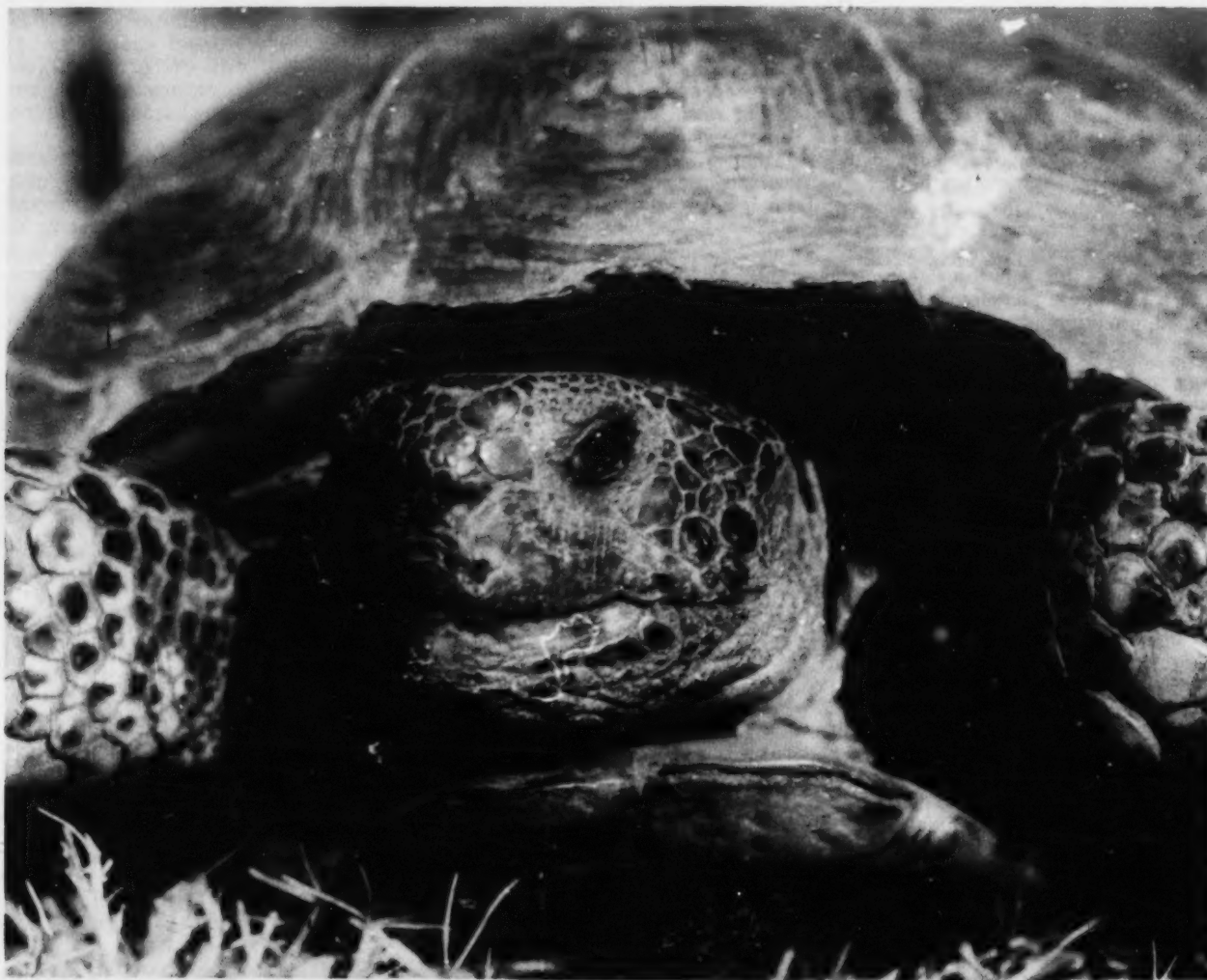


photo by Ed Wester

The gopher tortoise is a dark brown to grayish-black terrestrial turtle, with a shell that can be as large as 14.5 inches (37 cm) long and shovel-like forefeet that make it a proficient burrower.

Three Animals

(continued from page 4)

range by more than 80 percent. The status of the eastern population of the species is still under review.

Gopher tortoises are so named because they are proficient burrowers, digging tunnels that can reach up to 35 feet (10 meters) in length for cover and refuge from hot, dry weather. The tunnels are ecologically important not only to tortoises, but to the variety of other animals that seek temporary shelter or that live in them permanently. These species range from insects to burrowing owls, raccoons, possums, frogs, and snakes, including the Threatened eastern indigo snake (*Drymarchon corais couperi*). The burrows provide environmental conditions upon which these other organisms depend that may not otherwise be available within the region.

Only 364,000 acres (147,313 hectares) of suitable habitat remain for the gopher tortoise within its western range, and they are comprised of both public and private lands. The kind of land use changes responsible for most of the past habitat loss are expected to continue, and human population levels within the area are expected to rise. In addition to this habitat loss, modification of habitat associated with certain forest management practices also has contributed to the gopher tortoise's decline. The tortoise requires an open forest floor with grasses and forbs for food and sunny areas for nesting. Regular burning or thinning of trees is required to maintain the habitat in suitable condition, but private landowners may not always manage their lands in ways that benefit the species. Development of thick underbrush, closing of forest canopies, and clearcutting destroys food plants, inhibits nesting, and causes the tortoises to relocate to the edge of roadsides and ditch banks, increasing their susceptibility to human predation and vehicle mortality. Management of the DeSoto National Forest in southeastern Mississippi, which contains gopher tortoise habitat, is probably more compatible with the species' needs, but this national forest comprises only 22 percent of the total remaining western range.

The effects of habitat loss and modification on the gopher tortoise are compounded by the collection of these animals for use and/or sale as food or pets. Almost 97 percent of the young are taken by predators before the end of their second year; although the tortoise historically may have been able to withstand such losses, the added impact of taking by humans is likely leading to an overall decline. Research has shown that up to 20 percent of a colony has been taken at one time for human uses. The impact of taking is intensified by the fact that this activity is directed solely toward the



photo by Dick Biggins

The Cape Fear shiner inhabits streams with pools, riffles, and slow runs over a substrate of gravel, cobble, and boulders.

adult, or reproducing, segment of the population. This threat is further accentuated by the species' low reproductive rate. Females take 13 to 21 years to reach sexual maturity.

Because of the continuing threats to the species' survival in the western portion of its range, the FWS proposed to list the western population as Threatened on July 8, 1986. Although the gopher tortoise is protected against taking in the States of Alabama and Mississippi, and in the DeSoto National Forest, Federal listing under the Endangered Species Act could enhance these protection efforts and provide protection against taking for the species in Louisiana. Federal listing could also promote better management practices for gopher tortoise habitat on Federal lands.

A formal designation of Critical Habitat was not part of this proposed listing. Like the Alabama red-bellied turtle, the gopher tortoise's vulnerability to taking would also increase with the publication of the required Critical Habitat descriptions. Nevertheless, if this proposal is made final, Section 7 provisions will still provide protection for the tortoise against any Federal activities that may modify its habitat. Such activities known at this time include certain U.S. Department of Agriculture timber management practices and military training activities within the DeSoto National Forest.

Cape Fear Shiner (*Notropis mekistocholas*)

The Cape Fear shiner, the only fish known to be endemic to North Carolina's Cape Fear drainage, was proposed by the FWS on July 11, 1986, for listing as

an Endangered species. Although it is known to have occurred historically in nine stream reaches, the Cape Fear shiner apparently now survives in only three small populations. Of these, only the population at the junction of the Deep and Rocky Rivers in Chatham and Lee Counties appears strong. A 1985 survey of the second population in the Rocky River, upstream from the backwaters of the Rocky River hydroelectric facility, located only one specimen. The third population, located in the Deep River system in Moore and Randolph Counties, is represented by the collection of only six individuals above and below the Highfalls Hydroelectric Reservoir.

Dam construction in the Cape Fear drainage probably has had the most serious impact on the species by inundating the rocky, free-flowing riverine habitat upon which it depends. Two U.S. Army Corps of Engineers (COE) reservoir projects currently being considered for the Deep River could further threaten the shiner. Deteriorating water quality, mainly the result of siltation, has been another major factor in the species' decline. Other activities that could further modify the aquatic habitat, if the proper safeguards are not in place, include wastewater discharge, stream channelization, road and bridge construction, and changes in downstream flows released from existing hydroelectric facilities.

Included in the proposal to list the Cape Fear shiner as Endangered was a provision for designating Critical Habitat along approximately 5 miles (8 kilometers) of the Rocky River in Chatham County; 8 miles (12.8 km) of Bear Creek, Rocky River, and Deep

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Three Animals

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River in Chatham and Lee Counties; and 6 miles (9.6 km) of Fork Creek and Deep River in Randolph and Moore Counties. (Maps are available in the July 11, 1986, *Federal Register*.) If the listing and Critical Habitat proposals are made final, Federal agencies will be required to avoid any activity that is likely to jeopardize the species or adversely modify its Critical Habitat.

Available Conservation Measures

Among the conservation benefits provided by a listing under the Endangered Species Act as Threatened or Endan-

gered are: protection from adverse effects of Federal activities; prohibitions against certain practices; the requirement for the FWS to develop and implement recovery plans; the possibility of Federal aid to State conservation departments that have signed Endangered Species Cooperative Agreements with the FWS; and the authorization to seek land purchases or exchanges for important habitat. Listing also lends greater recognition to a species' precarious status, which encourages further conservation efforts by State and local agencies, various organizations, and individuals.

Section 7 of the Act directs Federal agencies to use their authorities to further the purposes of the Act by carrying out conservation programs for listed species. It also requires these agencies to ensure that any actions they

authorize, fund, or carry out are not likely to jeopardize the survival of a listed species or adversely modify its Critical Habitat. If an agency finds that one of its activities may affect a listed species, it is required to consult with the FWS on ways to avoid jeopardy or adverse modification. For species that are proposed for listing and for which jeopardy or adverse modification is found, Federal agencies are required to "confer" with the FWS, although the results of such a conference are non-binding. Potential conflicts almost always are avoided by planning early and using the Section 7 process.

Further protection is authorized by Section 9 of the Act, which makes it illegal to take, possess, transport, or traffic in listed animals, except by permit for certain conservation purposes.

Listings Become Final for Two Animals and Four Plants

During July 1986, the following taxa were added to the Federal List of Endangered and Threatened Wildlife and Plants:

Spikedace (*Meda fulgida*)

This small fish, the only species in its genus, once inhabited various streams within the Gila River drainage upstream of Phoenix in Arizona, New Mexico, and northern Mexico (Sonora). Because of widespread habitat modification, primarily the result of stream diversion structures and water quality degradation, the spikedace has disappeared from approximately 94 percent of its historical range. Several dams under consideration for construction could further threaten the species. For this reason, the FWS proposed on June 18, 1985, to list the spikedace as Threatened and to designate its Critical Habitat (story in BULLETIN Vol. X No. 7). The final listing rule was published in the July 1, 1986, *Federal Register*, but a decision on Critical Habitat was postponed (until no later than June 18, 1987) for further review of the economic data required for such a designation.

Florida Grasshopper Sparrow (*Ammodramus* *savannarum floridanus*)

An isolated subspecies of a more widely distributed bird, *A. s. floridanus* is endemic to the prairie region of south-central Florida. In the early 1900's, populations of this subspecies were reportedly large and widespread, but 1980-1984 surveys indicate that only about 250 adults remain. The main reason for this

decline was the loss of nesting and foraging habitat by the conversion of native vegetation to improved pasture. Because further habitat modification could lead to the bird's extinction, the FWS proposed it on December 15, 1985, for listing as Endangered (summary in BULLETIN Vol. XI No. 1). The final listing action was published July 31, 1986.

Uhiuhi (*Mezoneuron* *kavaense*)

A member of the pea family (Fabaceae), this tree grows up to 34 feet (10 meters) in height and is endemic to the Hawaiian Islands. Although it once was fairly common on the islands of Hawai'i, Maui, O'ahu, and Kaua'i, only three small populations, totalling fewer than 50 individuals, remain. They are located on State and private lands: North Kona, island of Hawai'i; western Kaua'i; and the Wai'anae Mountains, island of O'ahu. Only the O'ahu trees show signs of successful reproduction. The factors responsible for the uhiuhi's decline—grazing by domestic and feral livestock; competition from exotic plants; damage by non-native rodents and insects; and wildfires—threaten the species with extinction. It was proposed for listing as Endangered on August 5, 1985 (summary in BULLETIN Vol. X No. 9), and the final rule was published July 8, 1986.

Palmate-bracted Bird's-beak (*Cordylanthus palmatus*)

An annual herb in the snapdragon family (Scrophulariaceae), this California plant is known to occur only on a rare

saline-alkali soil type found in central California's lowland flats and plains. It has been collected historically from eight scattered locations in Fresno, San Joaquin, Yolo, Colusa, and Madera Counties. Currently, however, only three populations are known: two natural populations in Alameda and Yolo Counties, and a transplanted colony at Mendota State Wildlife Management Area in Fresno County. The others were lost when urbanization, agricultural operations, intensive livestock grazing, and other land uses altered the native plant communities that supported the species.

C. palmatus habitat continues to face threats from urban and agricultural development, and from off-road vehicle (ORV) use. In an effort to prevent the plant's extinction, the FWS proposed on July 15, 1985, to list it as Endangered (summary in BULLETIN Vol. X No. 8). The final listing was published July 1, 1986.

Steamboat Buckwheat (*Eriogonum ovalifolium* var. *williamsae*)

This member of the buckwheat family (Polygonaceae) is known from a 100-acre (40-hectare) site at Steamboat Hot Springs in Washoe County, Nevada. Seven colonies are scattered throughout the area on privately-owned land and property administered by the Bureau of Land Management (BLM). The plant is a low-growing perennial with small, greenish-white leaves arranged in tight rosettes, and it frequently forms large mats. Its habitat has been damaged by ORV use, dumping of refuse, and activities that result in changes in moisture patterns (to which this species is sensi-

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Final Listings

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tive). Other potential threats include the drilling of geothermal test wells, development of a recreational park, and mining on private lands. The subspecies was proposed September 12, 1985, for listing as Endangered (summary in BULLETIN Vol. X No. 10), and the final rule was published July 8, 1986. The BLM has expressed interest in working with the public and the private landowners to develop conservation programs for the species.

Pondberry (*Lindera melissifolia*)

L. melissifolia, a small deciduous shrub, can be distinguished from the other two North American members of its genus by its drooping, membranaceous leaves that give off a strong, sassafras-like odor when crushed. It is known historically from nine southeastern

States, but it apparently has been extirpated from Florida, Alabama, and Louisiana. Only 19 populations are known to survive in North Carolina, South Carolina, Georgia, Mississippi, Arkansas, and Missouri. The bottomland hardwood stands, poorly drained depressions, and margins of limestone sinks in which this moisture-dependent shrub grows have been tremendously reduced in number by land clearing and drainage activities. Because most of the remaining sites faced similar threats, the FWS proposed *L. melissifolia* on August 14, 1985, for listing as an Endangered species (summary in BULLETIN Vol. X No. 9). The listing became final July 31, 1986.

Available Conservation Measures

Now that they are listed, these taxa receive the full protection available under

the Endangered Species Act. Section 7 of the Endangered Species Act requires Federal agencies to ensure that any actions they fund, authorize, or carry out are not likely to jeopardize the survival of any listed species. If an agency determines that one of its activities may affect a listed species, it must consult with the FWS to find a way to avoid jeopardy.

The rules under the Act with regard to the take of listed species vary. It is illegal to take, possess, transport, or traffic in listed animals; for plants, however, the prohibition is limited to the removal of listed taxa from lands under Federal jurisdiction. Other provisions of the Act that apply to both animals and plants include the requirement for the FWS to develop and implement a recovery plan; the potential for Federal aid to State conservation departments that have signed Endangered Species Cooperative Agreements with the FWS; and the possibility of land acquisition or exchanges to conserve essential habitat.

Red Wolf

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in conjunction with the nonessential experimental population proposal. Potential management actions that would involve take include the recapture of wolves to replace transmitters or capture collars, the provision of routine veterinary care, the return of animals to the refuge if they stray outside its boundaries, or the return to captivity of animals judged to be unhealthy or a threat to human safety or property.

For years, a great deal of investigative effort by the FWS has been directed at locating suitable release sites throughout the historical range of the red wolf. Apparently ideal habitat for this species has been located at Alligator River National Wildlife Refuge, which comprises nearly 120,000 acres (48,564 hectares) of the finest wetland ecosystems found in the Mid-Atlantic region. Principal natural communities in the refuge include broad expanses of palustrine (non-riverine) swamp forests, pocosins, and freshwater and salt marshes. Adjacent to the refuge is a 47,000-acre (19,020-ha) U.S. Air Force bombing range with similar habitat. The very limited live ordnance expended by the Air Force and Navy on this range is restricted to two extremely small target areas.

Establishing an experimental population of red wolves on the refuge would greatly enhance the species' recovery potential by demonstrating the feasibility of a large predator reintroduction. The approved Red Wolf Recovery Plan calls

for the establishment of three self-sustaining populations at different locations throughout the species' historical range before it can be considered for possible reclassification from its Endangered status. By demonstrating that reintroduction of red wolves into suitable habitat is feasible, the FWS hopes that other Federal land management agencies in the Southeast will become interested in further reintroduction efforts.

If the experimental population proposal is approved, plans call for the acclimation of wolves for 6 months in captive pens on the refuge, followed by a release of three pairs in the spring of 1987. If that initial release is successful, two or three additional pairs would be reintroduced the next spring. The animals would be closely monitored via radio telemetry during the first 3 to 5 months following their release. After this initial monitoring phase, periodic checks would be made to determine if established home ranges are being maintained. It is anticipated that, because of the size and habitat characteristics of the reintroduction area, animals will remain within the boundaries of the refuge and adjacent military lands. If a wolf were to stray off the refuge, the FWS would recapture the animal.

Red wolves are shy animals, and most visitors to the refuge would not notice their presence. As a precaution, however, the proposed special regulations state that there would be no penalty for incidental take of wolves in the course of otherwise lawful hunting, trapping, or other recreational activities, or in defense of human life, provided that the taking is immediately reported to the FWS.

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bat population to recover to the extent that harvesting on a limited scale for domestic use could be sustained. The FWS recommended that (1) this taking be limited to subsistence harvest of not more than 20 percent of the fruit bat populations and (2) only traditional methods (nets) or air guns be used.

FWS observations of domestic use of fruit bats on Yap suggests that less than 20 percent would be taken annually for subsistence purposes. Illegal shipments of fruit bats from Yap, if any, will be monitored in cooperation with the Guam Division of Aquatic and Wildlife Resources and the Commonwealth of the Mariana Islands' Division of Fish and Wildlife through landing permits.

The Olympia, Washington, Field Office assisted Washington Department of Game personnel in recovering a whole peregrine falcon (*Falco peregrinus*) egg from an eyrie that had been abandoned in early June. The egg was sent to the Patuxent Wildlife Research Center in Laurel, Maryland, for pesticide and heavy metals analyses. This is the first whole peregrine egg to be recovered for analysis in Washington State.

A peregrine eyrie also was discovered in the Columbia Gorge by Washington Department of Game personnel. The site is located near The Dalles in an area where cross-fostering of peregrine chicks with adult prairie falcons had occurred a few years ago. One of the adults had a

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band, but the number could not be read. The pair fledged three young.

The wolf ecology volunteer at the Boise, Idaho, Field Office recently presented wolf recovery information and materials to 70 youths, and has also formed the Idaho Wolf Recovery Foundation to raise funds to aid in wolf recovery information distribution and education. Additionally, a wolf was seen in the Bear Valley area of central Idaho, an area where wolves have been reported previously.

As a result of the Gearhart Ranch Development in Oregon's Clatsop County, the Portland Regional Office has received several inquiries from potential developers and landowners indicating substantial interest in developing a Habitat Conservation Plan for the Clatsop Plain population of the Threatened Oregon silverspot butterfly (*Speyeria zerene hippolyta*).

The SESO recently assisted The Nature Conservancy in completing the first population estimate of the Endangered Borax Lake chub (*Gila boraxobius*) of southeastern Oregon. This dwarf chub species is endemic to Borax Lake, Lower Borax Lake, and adjacent ponds and marshes. The vast majority of the species' habitat is found in the 10-acre Borax Lake, where the population was estimated at slightly over 11,000.

Over 30 volunteers from Trout Unlimited assisted in a cooperative State and Federal effort to implement some of this year's recovery actions for the Threatened Paiute cutthroat trout (*Salmo clarki selenis*). During the Fourth of July weekend, the Trout Unlimited volunteers helped to install fences to improve habitat conditions in the Silver King Creek drainage, located in California's Alpine County. During the Labor Day weekend, the volunteers returned to install instream structures. Because this habitat lies within a newly established wilderness area, these recovery actions were done without the use of mechanized equipment.

Nine bald eagle (*Haliaeetus leucocephalus*) nestlings were removed from nests in British Columbia and released on Santa Catalina Island, California, by the Wildlife Studies Institute. Eight successfully fledged, but one was retained in captivity because it was injured from a fall during its collection. The eight immature eagles will supplement the island's current population of at least nine eagles, which were released in previous years.

A single immature bald eagle was released on the central coast of California by the Ventura Wilderness Sanctuary. This eagle, which was taken from a wild nest in northern California as an egg, was hatched by the Santa Cruz Predatory Bird Research Group and then raised by the San Francisco Zoo. A second release was scheduled, but the nestling died from unknown causes.

The SESO met with representatives of the Bureau of Land Management (BLM); Lake County, Oregon; Federal Highways Administration (FHWA); and Oregon Department of Transportation to discuss impacts of highway construction on habitat of the Threatened Warner sucker (*Catostomus warnerensis*) in Oregon. Because expansion of the roadway may affect Twentymile Creek, which is designated as Critical Habitat for the species in south-central Oregon, it was agreed that a bridge crossing will be modified to protect sensitive habitats. The BLM and FHWA will enter into a joint formal consultation (under Section 7 of the Endangered Species Act) with the FWS on the project.

FWS Great Basin Complex personnel at Reno, Nevada, located a population of the Dixie Valley tui chub (*Gila bicolor* ssp.), a Category-2 listing candidate, in a small impoundment supplied from an artesian well. Both juveniles and adults were present, but no estimate of the total population was made. There was no sign of the fish in other spring outflows and seeps in the area. This population of tui chub is one of only two known to exist in Dixie Valley.

The Peregrine Fund at Boise, Idaho, reported that 81 peregrine falcons were released in the States of Oregon, Washington, Idaho, Colorado, Utah, Wyoming, and Montana through July 1986. Another 78 peregrines were shipped to the eastern facility at Cornell University for later release.

Region 2—Of the 26 viable whooping crane (*Grus americana*) eggs left in nests at Canada's Wood Buffalo National Park this season, at least 22 hatched. The previous record number of eggs known to hatch in a year was 21 in 1984. Water conditions are good in Canada and biologists are hoping for another record year for chick survival. Of the 25 eggs taken by biologists for the Rocky Mountain or Patuxent Wildlife Research Center flocks, 12 hatched.

Dr. James Lewis, FWS Whooping Crane Coordinator, assisted National Wildlife Health Laboratory personnel in developing a proposal to research avian tuberculosis. This research is designed to identify prevalence of the disease in birds

that whooping cranes associate with and in habitats the cranes use. Three whooping cranes of the Rocky Mountain population were found infected with tuberculosis this spring. The goal of the research is to reduce prevalence of the disease in whoopers and waterfowl.

The Arizona Game and Fish Department (AGFD) has approached the FWS with an interesting and innovative proposal—establishing a trophy sport fishery for the Endangered Colorado squawfish (*Ptychocheilus lucius*) in the lower Colorado River, where self-sustaining populations no longer occur. It proposes that the FWS provide AGFD with fry-size squawfish from Dexter National Fish Hatchery. AGFD will then enact special fishing regulations governing take of the fish and will grow the fry to a larger size before stocking them in the river. It also proposes that the FWS provide an "experimental nonessential" designation for such reintroduced fish populations. AGFD personnel will monitor the program.

The Colorado squawfish has many qualities that might make it an ideal sport fish. It readily takes artificial lures, grows to a large size, and is good eating. Early settlers in the southwest called it the "white salmon of the Colorado."

The rapid spread of the sheephead minnow (*Cyprinodon variegatus*) in the Pecos River drainage of Texas has caused concern among southwestern fish experts. Through hybridization, the sheephead minnow is rapidly eliminating the native Pecos pupfish (*Cyprinodon pecosensis*), a Category-2 listing candidate, from the drainage. Most of the Pecos pupfish range in Texas has already been lost, and only a low dam has prevented the spread of the exotic sheephead minnow into New Mexico. To better understand the dimensions of the problem, the FWS has contracted a study through the Oklahoma Cooperative Fish and Wildlife Research Unit. Dr. Anthony Echelle will conduct the study to determine the extent of hybridization and try to find a method to prevent contamination of the remaining Pecos River in New Mexico.

Peregrine falcon reproduction in Big Bend National Park of western Texas has been barely sufficient to maintain current population levels, with 1.25 young produced per territorial adult pair. The monitoring effort was funded by the National Park Service and FWS. One new site was located. Results of recent analyses of peregrine prey in Big Bend indicate minimal levels of DDE residues in white-winged and mourning doves, but levels found (1-7 parts per million) in black phoebes and rough-winged and

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cliff swallows are sufficient to cause significant eggshell thinning and reproduction problems in the local peregrine population.

On February 25, 1986, the northern aplomado falcon (*Falco femoralis septentrionalis*) was listed as Endangered throughout its historic range in Mexico and Guatemala, and in the States of Texas, New Mexico, and Arizona. (See story in BULLETIN Vol. XI No. 3.) The last documented nesting record in the U.S. was in New Mexico in 1952. The Peregrine Fund currently has a small captive population of 12 aplomado falcons, and has begun an experimental release of captive-reared birds in south Texas. In 1985, four birds were released near Sarita, Texas, on the King Ranch.

Predation by great horned owls and harassment of the fledglings by scissor-tailed flycatchers proved to be difficult problems. In preparation for a second release effort in 1986, three criteria were used to select a release site: (1) amount of suitable habitat; (2) proximity to additional suitable habitat; and (3) potential problems with great horned owls. After examination of several potential sites, Laguna Atascosa NWR (on the south Texas coast) was selected.

On July 2, two male and two female fledgling aplomado falcons were released by Peregrine Fund personnel. A few days after the release, the oldest male disappeared. As of August, the three remaining fledglings were quickly approaching independence after 4 weeks of liberty. They have been observed by the hack site attendants pursuing and capturing both invertebrate and vertebrate prey, including dragonflies, fiddler crabs, and a bronzed cowbird. The Peregrine Fund hopes to continue releases at Laguna Atascosa and throughout the Texas prairie coastal region.

The presence of a jaguarundi (*Felis yagouaroundi cacomitli*) in southern Texas has been confirmed in the wild through the collection of a road-killed specimen in Cameron County. Although sightings of the species are frequently reported, the animal's presence has not been confirmed with a specimen or photograph since 1952 when a specimen was also obtained from Cameron County.

The road-killed animal was found several miles from an area where there have been several unconfirmed sightings in the past few years. Researchers from the Caesar Kleberg Wildlife Research Institute will actively monitor the area with cameras in an attempt to further document the presence of the species and determine its status.

State of New Mexico, White Sands Missile Range, and FWS personnel relocated the type locality of Todsen's pen-

nyroyal (*Hedeoma todsenii*) at the White Sands Missile Range in early August. They also surveyed for another population of the plant with no success. The small population (less than 500 individuals) at the missile range occurs in a very steep-sided, north-facing, gypseous limestone canyon. The potential habitat was mapped and an intensive survey of these areas will be organized for the 1987 field season.

The Bureau of Reclamation (BR) recently awarded a 4-year research contract at BioSystems Analysis Inc., of Santa Cruz, California, for studies on the breeding bald eagle population in central Arizona. The project will investigate the eagle's foraging ecology and movements, and will include telemetry of both adults and juveniles.

As of the end of August, 650 masked bobwhites (*Colinus virginianus ridgwayi*) were released on the Buenos Aires NWR in Arizona. An additional 1,400 are scheduled for release this year, accompanied by their south Texas quail foster fathers. Radio telemetry studies of these birds are being initiated by the Arizona Cooperative Wildlife Research Unit at the University of Arizona to determine the bobwhite's movements and habitat use patterns.

A 10,000-acre fire occurred on the refuge this spring, but the burn area has "greened-up" because of favorable summer rainfall. Thus far, few adult masked bobwhite have been found from last year's releases.

Four pairs of least terns (*Sterna antillarum*) fledged two young this summer on and near Bitter Lake NWR in southeastern New Mexico, which is the westernmost site for this population. Tern sur-

veys funded by the BR were conducted in mid-June along the Cimarron and Canadian Rivers in western Oklahoma. A total population of 200 adult terns was estimated for that area.

Region 3—The presence of a wild-hatched peregrine falcon chick, the first produced in the wild in the Midwest since the late 1950's, was confirmed near Weaver Dunes (MN) in June. However, shortly after, the chick disappeared. It is presumed that the chick was taken by a great-horned owl.

The Minnesota Department of Natural Resources reported that a population of the western prairie fringed orchid (*Platanthera praeclara*), a Category-2 candidate species located near Crookston, Minnesota, was destroyed by something that ate the plants off at ground level.

One of three prairie bush-clover (*Lespedeza leptostachya*) populations in Wisconsin was inspected on August 5. Approximately 160 plants were found, making this population, which is located near River Falls, the largest in the State. Currently, the plants seem to be holding their own, but they are located in an area that has potential for housing development.

A total of 51 peregrine falcons were released within Region 3 this year at 6 sites in 4 States. A report was also received of a peregrine taking up residency in downtown Indianapolis.

Region 3 staff members, along with a University of Wisconsin researcher, visited a number of northern wild monkshood (*Aconitum noveboracense*) sites in Iowa and Wisconsin during August. The trip's purpose was to gain familiarity with more of the sites included in the "Driftless Area" acquisition proposal and also to assist with the species' recovery plan revision. Various threats to the plants were witnessed firsthand, including grazing, road construction, and consumption by snails and lepidoptera larvae.

Region 4—The Pepsi Cola Company in Tampa, Florida, donated \$500,000 to the Lowry Park Zoo in Tampa for the construction of manatee rehabilitation, research, and public education facilities. The zoo is currently undergoing a multi-million dollar reconstruction and expansion program. At present, there are no holding facilities in Florida that have been specifically designed for holding, research, and display of manatees.

Biologists with Puerto Rico's Department of Natural Resources (DNR) are

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Male jaguarundi

photo by Gary Halvorson

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experimenting with a new nest box design for Endangered yellow-shouldered blackbirds (*Agelaius xanthomus*) in protected mangrove areas of southwestern Puerto Rico. In the past, DNR and FWS biologists placed traditional wooden nest boxes in three areas within the Pitahaya mangrove system. These boxes have several drawbacks: they are heavily used by Caribbean martins (which outcompete blackbirds for these sites), they require frequent maintenance, and they are infrequently used by blackbirds (2 out of 30 nests in 1986).

Biologists have observed that blackbirds prefer stump-top depressions to actual cavities for nesting. DNR's new artificial nest design capitalizes on this preference. It consists of a 4-inch diameter, 12-inch long section of brown PVC pipe with criss-crossing wires forming a base for nest construction either 4 or 10 inches down inside the pipe. The pipes are placed on posts, and rat guards are used to reduce predation. Thus far, 25 percent of the traditional nest boxes have been replaced with the new design. The new nesting structures are proving to attract more blackbirds.

The Caribbean Islands NWR has contracted with Louisiana State University's Cooperative Research Unit to study the population ecology of the St. Croix ground lizard (*Ameiva polops*) on Green Cay. The species was listed as Endangered with Critical Habitat in 1977. Once found throughout St. Croix, the U.S. Virgin Islands, and outlying cays, this lizard is now restricted to Green and Protestant Cays, off the north shore of St. Croix. The Protestant Cay population is relatively unprotected, with a large commercial resort occupying most of the cay; Green Cay, however, is part of the refuge.

An estimate of population numbers, time/activity budget, habitat preferences, and spacing patterns will be included in the study. Also included will be breeding chronology, mortality factors, and observations of feeding behavior. The data obtained from the study will be used to assess the current status of the species and to establish criteria for selection of suitable release sites for future reintroduction.

Harper's beauty (*Harperocallis flava*), an Endangered plant endemic to Apalachicola National Forest in the Florida panhandle, is essentially restricted to the shoulders of a single highway, where its numbers appear to be increasing. In an effort to see if new populations of this vulnerable species can be established in unoccupied savanna habitat, U.S. Forest

Service (USFS) personnel transplanted plugs of sod containing the plant into several sites last fall. An inspection of the area in late May showed that most of the transplanted plants were alive, and that many were flowering despite a severe drought. These encouraging first-year results indicate that transplantation may be a useful method for determining the habitat requirements and studying the population of this plant, and possibly for other plants of similar savanna and coastal plain bog habitats.

Staff from the Jacksonville, Florida, Endangered Species Field Office conducted a field survey of Alabama and Perdido Key beach mouse (*Peromyscus polionotus ammobates* and *P. p. trissyllepsis*) habitat. Despite the rapid growth of recreational and beach development along the Florida and Alabama Gulf coast, biologists found relatively little loss or deterioration of known beach mouse habitat since the last survey, conducted over a year ago.

Members of the Jackson, Mississippi, and Jacksonville Endangered Species Field Offices met at Fort Pickens, Florida, on July 1 with representatives of the National Park Service, the Florida Game and Fresh Water Fish Commission, and the Alabama Cooperative Wildlife Research Unit to discuss the recently prepared technical draft recovery plan for the Alabama, Choctawhatchee (*P. p. aliphrys*), and Perdido Key beach mice. Jointly prepared by the Jackson and Jacksonville staffs, the draft was well received by these reviewing agencies. Comments and revisions will be incorporated into an agency draft of the recovery plan, which is due for completion by December 1, 1986.

An unusual nest was discovered during this year's annual brown pelican (*Pelecanus occidentalis*) nesting survey at Gaillard Island in Mobile Bay, Alabama. Amid a laughing gull (*Larus atricilla*) nesting area, a single herring gull (*L. argentatus*) nest containing two eggs was noted. In recent years, ornithologists have noted that herring gull nesting has been spreading to the south; however, the most southerly nesting record for this species had been from North Carolina. Other species nesting on this man-made island, created by the Corps of Engineers to contain dredged material, are least terns (*Sterna albigrons*) and Caspian terns (*S. caspia*). Over 200 brown pelican nests were documented during the survey. The population continues to increase since the colony's inception 4 years ago.

Dr. Mike Howell of Samford University, acting under contract with the Jackson Endangered Species Field Office, has

completed the second of five annual population surveys of the Endangered water-cress darter (*Etheostoma nuchale*). This darter is restricted to three localities in Jefferson County, Alabama. The 1986 surveys indicate that the darter is now flourishing in two of the three known spring pond habitats. However, the population at the third site continues to decline. The FWS intends to initiate an effort to establish additional populations within the species' former range.

In a recent survey conducted for The Nature Conservancy, researchers discovered that one of two known populations of the Threatened Stock Island tree snail (*Orthalicus reses reses*) has been extirpated and the remaining population reduced to fewer than 100. The two populations were confined to a patch of natural hammock approximately 4.8 acres in size on a municipal golf course. The area is immediately adjacent to private property on Stock Island in Monroe County, Florida. The only remaining trees that provide habitat for the snails occur in an otherwise paved municipal county parking lot adjacent to the golf course.

Stock Island tree snails inhabit a wide variety of hammock trees. They feed on lichens, fungi, and algae growing on the limbs and leaves. Tree snails lay their eggs in soft leaf litter at the base of trees and remain buried in the litter from 72 to 96 hours during nesting. Most of the remaining trees on the county parking lot have white gravel or cement poured at their base, eliminating the leaf litter and rendering them useless for egg-laying. Researchers estimate that if action is not taken immediately, this snail could become extinct within the next 5 years.

The Jacksonville, Florida, District of the Army Corps of Engineers will prepare an Environmental assessment concerning the potential impacts of residential development around the West Palm Beach Water Catchment Area (CA). The CA was purchased by the city to safeguard an important wetland that supplies drinking water. In 1985, the CA was discovered to be critical drought-related habitat for the Endangered Florida snail kite (*Rostrhamus sociabilis plumbeus*). Almost the entire known population, 372 kites, roosted adjacent to the CA on June 12. At least one nesting occurred.

The CA is surrounded by private lands for which a variety of dredge-and-fill permits are being sought. The Corps of Engineers, which has jurisdiction over many of the wetlands in the area, will address the potential cumulative effects of development around the CA on endangered species and the general environment.

The Endangered Species Field Office in Jackson, Mississippi, has received a

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Regional News

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status survey report on the bog spice bush (*Lindera subcoriacea*), a Category-2 listing candidate. The report was prepared by the Mississippi Natural Heritage Program (MNHP) of the Mississippi Museum of Natural Science, under contract with the FWS. The bog spice bush is a deciduous shrub that occurs in wet, peaty, shrub bogs and along peaty drainages at scattered sites in Louisiana, Mississippi, Georgia, South Carolina, and North Carolina. Many of the populations have low numbers of plants and are threatened with habitat destruction. The MNHP conducted field surveys only in Mississippi and Louisiana. Additional information from the other States will be obtained, and all data will be analyzed to determine if this species warrants a proposed listing.

Region 5—The annual Virginia big-eared bat (*Plecotus townsendii virginianus*) maternity colony census was conducted during June in West Virginia. Seven of the nine known maternity colonies had increased in size from 1985, while two had decreased. Overall, the population of known reproductive females has increased by more than 14 percent from last year and nearly 24 percent from 1983, the first year the counts were made. This increase is likely due in part to protective measures (i.e., gates and fences) taken by the FWS and the USFS, and to the cooperation of cavers in abiding by entry restrictions when the bats are present.

The National Wildlife Federation's Raptor Information Center reports that bald eagle reproduction around the Chesapeake Bay is still on the increase. In Maryland, Delaware, and Virginia, there were a total of 136 occupied nests this year, 100 of which were successful, producing 190 eaglets. This is the highest number of young produced since the Chesapeake Bay Bald Eagle Banding Project began 10 years ago.

Elsewhere in the Chesapeake Bay region, success was mixed. West Virginia's one known nesting pair of eagles fledged triplets; in Pennsylvania, however, there was no known nesting success this year.

During July 6-11, eight young bald eagles were collected from the Winnipegosis area of Manitoba, Canada. These eaglets were later flown by chartered aircraft to the Delaware Bay hawk sight in southern New Jersey. The following week, 2 additional eagles that fell from their nests also were sent to New Jersey, bringing the total to 10 eaglets to be released.

Peregrine falcons nested successfully at 8 sites in New York, New Hampshire, and Vermont, fledging 16 young. In Maryland, 4 nesting pairs fledged 11 young, and in Virginia, 3 successful nests produced a total of 7 fledglings. In all this year, at least 52 peregrines are known to have been produced in the wild in Region 5 States. In addition to these, approximately 100 birds were released as part of the Peregrine Fund's ongoing restoration effort.

Thirty-two Plymouth red-bellied turtles (*Pseudemys rubriventris bangsi*) were released at the Massasoit NWR in Plymouth County, Massachusetts, in another attempt to revive this highly Endangered species found only in a small corner of southeastern Massachusetts. This is the second consecutive year that Massachusetts Division of Fisheries and Wildlife and New England Aquarium personnel have salvaged eggs from the wild and transferred them to a controlled environment at the aquarium in Boston, where they were allowed to grow successfully through the winter and spring months. The fate of the Plymouth red-bellied turtle in recent years has worried conservationists, who estimate that only 300 adults remain, but this "head start" program may help the subspecies win the race of survival.

Region 6—Summer surveys of black-footed ferret (*Mustela nigripes*) habitat near Meeteetse, Wyoming, revealed two ferret families and three individual animals. Four of these ferrets (three juvenile females, one mature male) have been captured and added to the six ferrets previously held at Wyoming Game and Fish Department's Sybille Wildlife Research Unit located near Wheatland, Wyoming. Several additional animals are known to remain in the wild near Meeteetse.

The Wyoming Game and Fish Department prepared "Recommendations for Capture of Black-footed Ferrets to Enhance the Captive Breeding Program in 1986." This document recommends management actions based on the total number of ferrets found at Meeteetse in 1986. The FWS has reviewed and supports this plan.

Construction of an expanded captive breeding facility in which to house and rear captive ferrets was started at the Sybille Wildlife Research Unit in July 1986. This facility should be completed by the end of November.

A pair of adult peregrine falcons nested on the roof of the Westin Hotel in downtown Salt Lake City, Utah, this year. Four eggs were laid, but they disappeared. The birds renested, laying three more eggs in a hack box which had been placed on the hotel roof by wildlife offi-

cials. These eggs did successfully hatch.

On August 10, the young birds, suspected to be two males and one female, fledged from the hack box. There was an effort by personnel from the Utah Division of Wildlife Resources and the FWS to protect the fledglings from the hazards of the big city, such as traffic and tall glass buildings, during the bird's first days on the wing. Wildlife officials sporting bright orange safety vests ran out amidst the traffic two or three times to perform rescue missions. Orange signs were posted on the street in front of the hotel that cautioned, "Falcon Bird Watch Area—Prepare to STOP." The birds have now taken to the air and are doing well, and the operation has ended.

Region 7—FWS biologists recently visited Amak Island, a remote volcanic island north of the Alaska Peninsula, where two endemic Category-2 listing candidates are found. Neither the Amak vole (*Microtus oeconomus amakensis*) nor the Amak song sparrow (*Melospiza melodia amaka*) had been observed in several years. Although no voles were seen, numerous song sparrows were encountered. It is unknown, however, whether the sparrows on Amak are *M. m. amaka* or a mainland subspecies pioneering unoccupied habitat.

Efforts to locate the Aleutian shield fern (*Polystichum aleuticum*), a Category-2 listing candidate, will continue when FWS botanist Steve Talbot attempts to rediscover a small population last observed on Alaska's Adak Island in 1975. Perhaps the rarest fern in North America, this species is Region 7's highest priority for Endangered Species Act listing.

Surveys for peregrine falcons and nestling banding efforts continue along several major Alaska rivers. Preliminary results indicate that a stable or increasing population trend is continuing for peregrines along most rivers. As in past years, the surveys were a cooperative effort involving volunteers, university students, and biologists from the FWS, the Bureau of Land Management, and the National Park Service. The Alaska Department of Fish and Game, through the Endangered Species Act-Section 6 program, also participated this year by surveying four rivers in northwest Alaska.

Region 8 (Research)—The last known wild female California condor (*Gymnogyps californianus*), a member of the only known pair breeding in 1986, was caught on June 5 by researchers from the Condor Research Center in Ventura, California. The condor was transported to the San Diego Wild Animal Park, where

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New Hope for the Southern Sea Otter

Editor's note: On August 15, 1986, the FWS proposed to establish an experimental population of the southern sea otter, now listed as Threatened, at San Nicolas Island off southern California. Because of the controversy surrounding the management of this taxon, Wilbur (Skip) Ladd, Project Leader of the FWS Office of Sea Otter Coordination in Sacramento, California, has prepared the following overview:

—Part 1—

Populations of the sea otter (*Enhydra lutris*) once inhabited shallow, nearshore marine waters throughout the northern Pacific Ocean, from Japan (Kurile Islands), Russia (eastern Kamchatka), Alaska, Canada, and the continental United States to central Baja California,

Mexico. They were reduced to near extinction by the late 1800's, however, as a result of commercial fur hunting. Although the exact numbers are not known, estimates are that the overall population once numbered between 150,000 and 300,000; these numbers were reduced to approximately only 2,000-3,000 in several remnant populations by the time commercial exploitation was stopped in the early 1900's. One of the surviving colonies was in central California, along the Big Sur coast, where there were an estimated 100-300 by 1938. (The historical population in California has been estimated at between 16,000 and 20,000.) Given the full protection of the Fur Seal Treaty Act and State law, the California population slowly began to grow and repopulate parts of its historical range until the early to mid-1970's. At that time, the popula-

tion was estimated to contain about 1,800 animals, or about 10 percent of its historical level.

The taxonomic status of sea otter populations has been debated for years by the "splitters and lumpers." The splitters have described three subspecies (*E. l. lutris*, *neréis*, and *gracilis*) and the lumpers one (*E. l. lutris*). This debate rages on, and it may never be resolved to the satisfaction of both groups. During the Endangered Species Act (Act) listing process, the Fish and Wildlife Service (FWS) acknowledged the taxonomic controversy but took the conservative position of using the subspecific name, *E. l. neréis*, in the final listing document. Supplemental information pointed out that the taxonomic status was not a consideration as to whether or not the California sea otter should be listed because the Act al-

(continued on next page)



Sea otter (*Enhydra lutris*) in Monterey Bay, California.

lows the listing of distinct populations of vertebrate animals.

Population Status and Trend

Since at least the mid-1970's, California sea otter numbers have not grown and may have experienced a slight decline, although the animals did continue to reoccupy additional historical habitat. Until 1982, the population size was estimated using data from aerial and ground counts, with extrapolations to account for various biases. Beginning in 1982, ground counts, supplemented with aerial counts in inaccessible areas, have been the standard method. The counts since 1982 have ranged from a low of 1,221 in fall 1985 to a high of 1,570 in spring 1986. No discernible trend has been apparent since 1982. The current range lies along a 220-mile stretch of the central California coast between Anc Nuevo Point in Santa Cruz County and the mouth of the Santa Maria River in San Luis Obispo County, with a few individuals sighted occasionally outside that range.

Contemporary Conflicts and Problems

Contemporary conflicts, for the most part, can be summed up in three issues—1) effects of otters on shellfisheries, 2) incidental entanglement and drowning of sea otters in commercial halibut gill and trammel nets, and 3) the effects of outer continental shelf (OCS) oil development, production, and transportation.

During the absence of sea otters following the species' commercial exploitation, shellfish and other macro-invertebrates, the principal prey of otters, flourished throughout much of the California coast. Abalone, crab, Pismo and other clams, and sea urchin populations grew large enough to attract a commercial harvest for foreign and domestic markets. For example, an intensive and lucrative abalone fishery became established by the 1950's and harvest of Pismo clams became a popular recreational activity. By the late 1970's, when the sea otter had reestablished itself along several hundred miles of coast, the red abalone and Pismo clam populations along the central coast had been depleted to the point that no commercial harvest was possible and sport harvest was reduced. Although the reasons for the decline in these shellfisheries are complicated by such possible factors as overharvest by humans and deterioration of habitat quality, biologists generally accept the notion that sea otters cannot co-exist with commercial shellfisheries due to their effectiveness as predators. Sea otters consume about 25 percent or more of their body weight each day. Because of the adverse effects that sea otters can

have on shellfisheries, any recovery action that would promote range expansion or establishment of additional colonies is opposed by many shellfishery advocates.

The second major contemporary issue concerns the accidental entanglement and drowning of sea otters in commercial gill and trammel nets placed in nearshore waters for harvest of halibut. This problem was not recognized either at the time the sea otter was listed (January 1977) or even when the recovery plan was approved (February 1982). Evidence obtained later in 1982 indicated that many non-target species, such as seabirds and marine mammals (including sea otters) were being taken incidental to the fishery. A monitoring effort was initiated that year by the California Department of Fish and Game (CDFG) to document the extent of the losses. By late 1984, the documentation was sufficient, the data analyzed, and a conclusion reached that between 1982 and 1984 an average of 80 sea otters per year, or about 6 percent of the population per year, had been accidentally drowned in commercial fishing nets. The analysis further indicated that, during the period of 1973 to 1983, annual sea otter deaths from drowning probably ranged from 49 to 168. State and FWS biologists concluded that these losses were large enough to have prevented the population from growing for the past 10-15 years.

A series of temporary and permanent closures to this type of fishing within waters 15 fathoms or less in depth were put into effect by the State in 1985, and they appear to have reduced the incidental entanglement of sea otters by about 40 percent. On September 28, 1986, the State of California promulgated regulations putting into effect additional closures in some waters out to 20 fathoms in order to further reduce sea otter drownings. These restrictions also adversely affected a significant portion of the central coast halibut fishery; therefore, the legislation also contains provisions for providing low interest loans to fishermen to allow them to switch to alternative gear.

The potential conflict between sea otters and OCS oil development stems from the risk of oil spills associated with such development and the requirement under Section 7 of the Endangered Species Act that no Federal agency shall permit, fund, or carry out any activity that is likely to jeopardize the continued existence of a listed species in the wild. Both the oil industry and the Interior Department's Minerals Management Service (MMS) consider the California OCS as having some of the highest potential for producing oil in the nation. Within California, the Santa Barbara Channel-Santa Maria Basin, which extends from just inside the present sea otter range southward through the area expected to be reoccupied by otters over the next 10-20

years, is the main area of interest for oil development.

Section 7 consultations during the past 2 years on OCS development in the southern and central Santa Maria Basin and a single platform in the northern Santa Maria Basin (abreast of the sea otter range) concluded in "no jeopardy" biological opinions. These opinions were based on a comprehensive sea otter risk analysis and on modeling conducted for the consultations. However, a consultation on potential development of six additional platforms in the northern Santa Maria Basin completed in August of this year concluded that, when added to the already existing (baseline) risks from OCS development, tanker accidents, and incidental losses in fishing nets, development of the additional platforms would likely jeopardize the continued existence of the southern sea otter. The opinion offered a reasonable and prudent alternative of incrementally evaluating each of the hypothetical platforms, if and when a development plan for any of them is actually submitted for consideration.

Listing and Recovery Program

The sea otter is particularly vulnerable to contamination of its fur because, unlike other marine mammals, it has no layer of blubber to insulate its body from the chill of the ocean. Instead, it depends on an extraordinarily high metabolic rate and on its unusually dense underfur, which traps an insulating layer of air, to maintain its body temperature. Oil spills along the central California coast are of special concern because studies have indicated that if 25-30 percent or more of a sea otter's pelage is coated with oil, it will lose its insulating properties and the animal will likely die of hypothermia.

It was because of its small population size, greatly reduced range, and vulnerability to accidental oil spills that the FWS listed the southern sea otter in 1977 as "Threatened." It was a time when transportation of crude oil from Alaska's North Slope was just beginning, oil and gas development on California's OCS was only being talked about, and incidental take of otters in commercial fishing nets was not even recognized as a potential problem.

A recovery plan was prepared and approved in February 1982. The goals cited in the plan are to: (1) minimize the risk of oil spills from tanker accidents and other sources; (2) establish at least one additional breeding colony outside the present range; (3) minimize vandalism, harassment and incidental take; (4) monitor recovery progress; and (5) integrate the recovery plan into plans of local coastal community governments.

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Sea Otter

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Recovery is beginning to move forward on several fronts. Studies funded by MMS are under way to test potentially effective methods for capturing, cleaning, and rehabilitating oiled otters, and for moving otters out of the path of oil slicks. Major investigations are proceeding in an effort to better document the population dynamics, movements, and behavior of the current California population in order to understand the possible effects of an oil spill on the population. The problem of incidental take in commercial fishing nets has been documented, and remedial measures taken by the State have resulted in a substantial drop in this source of mortality.

Oil spill risks, both from tankers and OCS development, have been analyzed and quantified. The FWS' initial estimate of the high risk of tanker spills has been verified through recent comprehensive modeling studies. In fact, MMS has estimated that about 3.7 tanker spills will occur over the next 30 years within or adjacent to the current sea otter range. The tanker risk translates into a nearly 5 percent chance that greater than 20 percent of the current California sea otter population will die as a result. Although the odds are lower, about 1 chance in 67, some 40 percent of the sea otter population could be lost due to tanker spills over the next 30 years. Oil spill risks from OCS development, if it expands closer to and penetrates the sea otter range, will further increase the overall

risk of oil spill damage to the sea otter population.

Since minimizing the actual risk of oil spills is difficult, especially those resulting from tanker accidents, the FWS has placed great emphasis on the recovery goal of minimizing the effects of oil spills. Of special importance is the FWS' current proposal to establish an experimental population of southern sea otters at a location within the historic range, but distant enough from the current range that a single large oil spill or similar event would not affect both populations simultaneously.

End of part one. Next month's conclusion outlines the proposal to establish an experimental population of sea otters at San Nicolas Island.

Endangered Wildflower Calendar

The 1987 *Endangered Wildflower Calendar* is now available from the American Horticultural Society (AHS). This 8½-by 23-inch wall calendar features full-color photographs of 16 rare American wildflowers, individual summaries on their status, and general information on endangered plants. Proceeds from the calendar sales enable the AHS to award up to \$250 to non-profit organizations whose members or supporters provide information on the rediscovery of plants generally thought to be extinct. To order, send \$6.95 per calendar (\$6.25 for AHS mem-

bers) to Jeanne Eggeman, AHS, P.O. Box 0105, Mount Vernon, Virginia 22121. For orders of 3 or more calendars, send \$6.45 for each (\$5.75 for AHS members). These prices include postage and handling, but Virginia residents should add 4 percent sales tax.

For the AHS list of plants that are considered extinct, send a self-addressed business-sized envelope and \$1.00 for postage and handling to the Wildflower Rediscovery Project at the same address.

We Still Need Your Help

Your response to our calls for additional articles on endangered species research and management activities has been gratifying. We invite you to continue sending us such reports, along with photographs or drawings. Your ideas and comments on how to make the BULLETIN more effective also are most welcome.

Habitat Rehabilitation on the Tennessee-Tombigbee Waterway

Andrew C. Miller and Jack C. Mallory
U.S. Army Corps of Engineers

In a unique cooperative project planned by the U.S. Army Corps of Engineers (COE) and the Fish and Wildlife Service, scientists from the COE's Waterways Experiment Station (Vicksburg, Mississippi) and Mobile District (Mobile, Alabama) have designed a segment of rehabilitated habitat for freshwater mussels, aquatic insects, and fishes that require shallow, rapidly flowing water and gravel substrate. Although the project was initiated to reconstruct a segment of the habitat lost to the Tennessee-Tombigbee Waterway, it was not required and was not part of a mitigation agreement. The habitat, prepared with 25,000 cubic yards of 1- to 3-inch gravel, was placed below a minimum flow release structure in the Columbus Dam, which passes 200 cubic feet of water per second into a bendway of the Tombigbee River.

The habitat was designed so that the gravel would constrict the river to create

a flow velocity of 1.5 feet per second and provide substrate for aquatic organisms. After more than one year, the gravel bars have remained stable and show no evidence of erosion or excessive sediment accretion. Thirty-one species of aquatic invertebrates, including immature mayflies, caddisflies, stoneflies, small clams, and crustaceans, have been collected from the habitat. The presence of these organisms, along with the crystal darter (*Ammocrypta asprella*), which is listed by the State of Mississippi as endangered, and the uncommon blue sucker (*Cyprinotus elongatus*), indicates that a diverse aquatic community is developing. Both of these fishes are Category 2 candidates for future listing under the Endangered Species Act.

Biologists and planners of the COE are interested in exploring the possibility of transplanting individuals of the freshwater mussel *Epioblasma (Dysnomia) penita*, recently proposed for Federal listing as

Endangered (*Editor's note: see BULLETIN Vol. XI No. 5*), to this site. Currently, this mussel is found in the nearby Buttahatchie River, where it inhabits clean gravel substrate in rapidly flowing water.

It is hoped that data from the Columbus Dam site will help planners and engineers rehabilitate areas that have been altered by human activities and provide habitat for organisms that are becoming uncommon in large waterways. In addition, it is a unique outdoor laboratory where growth and behavior of organisms living under precisely designed physical conditions can be studied.

For more information, telephone Andrew Miller of the COE Waterways Experiment Station (commercial 601/634-2141, FTS 542-2141), or Jack Mallory of the COE Mobile District (205/690-2723, FTS 537-2723).

Biologists Study Group of Prairie Crayfish

James H. Stewart

Jackson, Mississippi, Endangered Species Field Office

Biologists with the Jackson Endangered Species Field Office are investigating the status of a group of prairie crayfish related to *Procambarus hagenianus*, an apparently common species. The other species *P. barbiger*, *P. cometes*, *P. connus*, and *P. poquum*, are known from limited collections, and their decline is related to extensive alteration of prairie habitat.

All five species occur in Mississippi and Alabama. These crayfish are primary burrowers, and they depend on their burrows throughout their entire life cycle. The historic and ideal prairie habitat for hagenianus crayfish is described as an upland area of alkaline soil with native grasses and herbs and a low tree density. Prairies where hagenianus crayfish occur are probably preclimax communities maintained by fire and soil conditions. Many former prairies have been converted to row crops, pastures, and forest, and other prairie habitat has been degraded by overgrazing, erosion, and invasion by non-native species. Prairie remnants in many cases are now confined to field edges, and to highway and railroad rights-of-way where burning or mowing controls woody vegetation. The U.S. Forest Service (USFS) owns some small prairies as well as two prairie areas within Bienville National Forest in Mississippi.

P. barbiger is known from three populations in the Jackson Prairie in east cen-

tral Mississippi. A recent survey of the species uncovered a second population in Scott County and a small, apparently declining, population in Newton County. The search of over 25 prairies has failed to find other populations. Observations indicate that this species does not tolerate disturbance of the surface soils. Prairie soils that have been row cropped, converted to pasture, or otherwise disturbed, then allowed to revert back to prairie, apparently do not support this species. For instance, one large reestablished prairie, maintained by the USFS, meets all of the known habitat requirements of *P. barbiger*, yet the species does not exist there. Two of the three currently known populations occur on USFS land. One of these small sites is a typical prairie with little wooded vegetation; the other has a very limited open prairie that is being encroached upon by red cedar and pine trees, although *P. barbiger* still exists among the scattered red cedar. Biologists have been unable to trap the specimen within the pine trees. The third known *P. barbiger* population occurs within an area of approximately one acre located between a road and a pasture. About half of this site is mowed during right-of-way maintenance, while the remainder is grazed lightly.

P. barbiger apparently is declining because of habitat impacts and the encroachment of a competing crayfish spe-

cies. The lack of historic information is partially the result of this species' habits. *P. barbiger* only surfaces to feed and breed during very wet periods and generally at night. Since *P. barbiger* is believed to burrow 15 to 20 feet or more, the only feasible survey method is trapping the crayfish when they surface. Using a trap in the entrance of the burrows has been successful during wet weather. If funding becomes available, more surveys of *P. barbiger* will be conducted.

More adaptable than the other species, *P. hagenianus* is known from seven counties in Mississippi and three counties in Alabama. This species occurs in cultivated prairie soils, and once it was so abundant that it was an agricultural pest to row crops. Three other species of hagenianus crayfish are more uncommon. *P. cometes* is known from three sites in the flatwoods belt of Oktibbeha, and the black belt of Lowndes Counties, Mississippi. The most recent collection of this species was in 1968. Neither *P. connus* nor *P. poquum* have been collected in 50 years. *P. connus* is known from only one location in Carroll County, Mississippi, in an area of brown loam and thick loess soils. *P. poquum* is known from only two sites in Chickasaw County, Mississippi, in the upper coastal plain of Tibbie Creek.

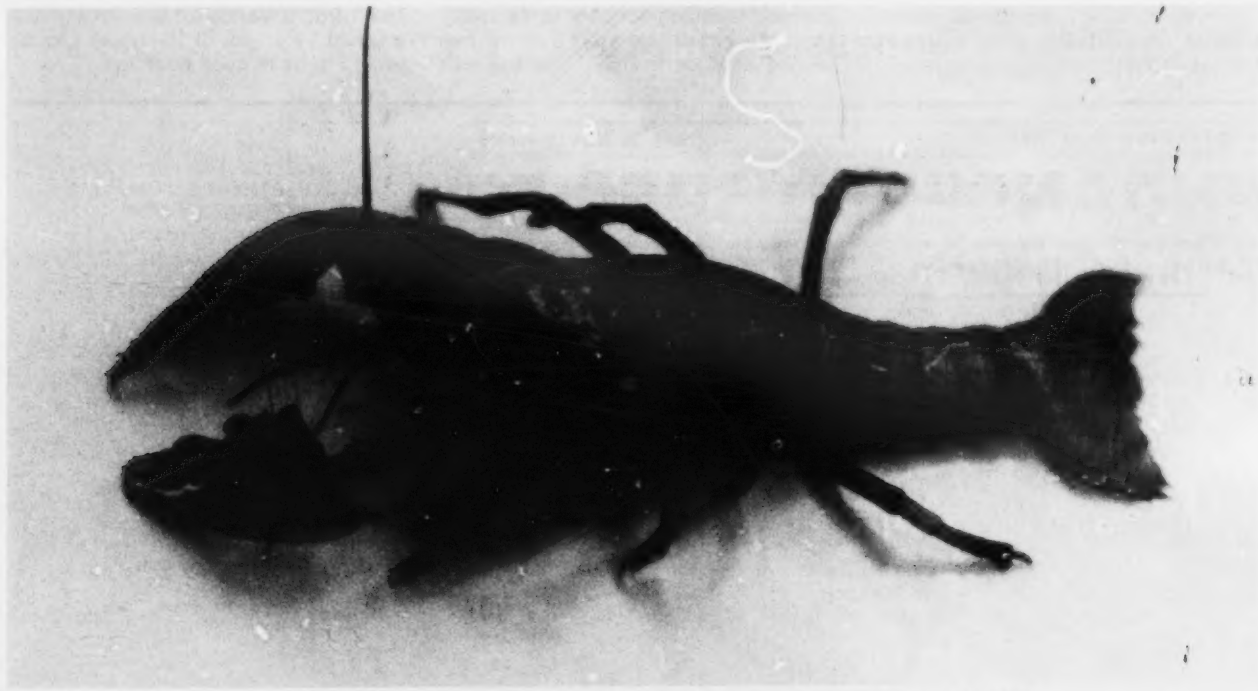


photo by James Stewart

Procambarus barbiger from Scott County, Mississippi, site of a new population discovered in 1986.

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she was put in quarantine prior to incorporation into the captive breeding program. Blood samples taken from the bird and analyzed by the National Wildlife Health Center in Madison, Wisconsin, revealed relatively low levels of lead. As of October 1, three male California condors remained in the wild.

The second egg from the 1986 breeding pair of California condors was brought into captivity for incubation on April 15 and hatched with assistance on June 6 at the San Diego Wild Animal Park. The hatching of this chick and the capture of this parent brings the number of California condors in captivity to 24.

On June 23-25, the FWS and the Upper Mississippi River Conservation Committee sponsored a two-day resource issue assessment of the freshwater mussel die-offs in the eastern United States. Over 80 representatives from the FWS, State and Federal resource conservation agencies, and private organizations participated. No apparent causes of the die-offs surfaced; however, most participants felt the areas of disease, contaminants, and population ecology should be the focus of future research efforts. Abstracts of the technical sessions can be obtained from the Office of Information Transfer, 1025 Pennock Place, Suite 212, Fort Collins, Colorado 80524. Copies of the proceedings will be available in early 1987.

A male Kirtland's warbler (*Dendroica kirtlandii*) that Patuxent Wildlife Research Center (PWRC) biologists banded in

February 1985 in the Bahamas has been sited for two consecutive years on both its wintering and breeding grounds. During winter 1986, the warbler was sited and studied extensively at the same location on the island of Eleuthera, where it was banded the previous winter. In July 1986, the warbler was sited again on the species' breeding territory in Michigan. The bird mated this year and the pair fledged a brood in July. This suggests

that the male probably arrived at the breeding grounds no later than the last week of May.

On August 13, a Kirtland's warbler was captured and radio-tagged by wildlife biologists in Crawford County, Michigan. This event makes the first time a Kirtland's warbler has been radio-tagged. The bird, a young-of-the-year male, weighed 14 grams (0.45 ounce) and appeared to be in good condition.

BOX SCORE OF LISTINGS/RECOVERY PLANS

Category	ENDANGERED			THREATENED			SPECIES* TOTAL	SPECIES HAVING PLANS
	U.S. Only	U.S. & Foreign	Foreign Only	U.S. Only	U.S. & Foreign	Foreign Only		
Mammals	25	20	242	4	0	22	313	23
Birds	61	16	141	3	2	0	223	54
Reptiles	8	6	60	8	4	13	99	21
Amphibians	5	0	8	3	0	0	16	6
Fishes	39	4	11	21	5	0	80	40
Snails	3	0	1	5	0	0	9	7
Clams	23	0	2	0	0	0	25	21
Crustaceans	3	0	0	1	0	0	4	1
Insects	8	0	0	5	0	0	13	12
Plants	101	6	1	24	3	2	137	46
TOTAL	276	52	466	74	14	37	919	231**

* Separate populations of a species, listed both as Endangered and Threatened, are tallied twice. Species which are thus accounted for are the gray wolf, bald eagle, American alligator, green sea turtle, Olive ridley sea turtle, leopard, and piping plover.

** More than one species may be covered by some plans, and a few species have more than one plan covering different parts of their ranges.

Number of Recovery Plans approved: 197

Number of species currently proposed for listing: 27 animals
38 plants

Number of Species with Critical Habitats determined: 96

Number of Cooperative Agreements signed with States: 47 fish & wildlife
26 plants

August 31, 1986

August-September 1986

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ENDANGERED SPECIES

Technical Bulletin

Department of Interior, U.S. Fish and Wildlife Service
Endangered Species Program, Washington, D.C. 20240

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ENDANGERED SPECIES

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Protection Proposed for Butterfly and Two Plants

During September 1986, the following taxa were proposed by the Fish and Wildlife Service (FWS) for listing under the Endangered Species Act:

Pawnee montane skipper (*Hesperia leonardus montana*)

This rare brownish-yellow butterfly, endemic to a small mountainous area in central Colorado, was proposed September 25 for listing as a Threatened subspecies. Its limited habitat already has been damaged by off-road vehicle (ORV) use, and up to half of what remains could be eliminated by a proposed reservoir.

Pawnee montane skippers are small, with a wingspan of slightly over one inch (2.5 centimeters), and they complete their life cycle within a single year. Their flight period begins in mid to late August, the adults spending most of their short existence mating and feeding. They secure nectar from several plants, such as the musk thistle (*Carduus nutans*), the Canada thistle (*Cirsium arvense*), an unidentified native thistle, a native pink-flowered *Cirsium*, *Monarda* sp., *Chrysopsis*, and the prairie gayleather (*Liatris punctata*); their larval food plant is blue grama grass (*Bouteloua gracilis*).

The only places from which the Pawnee montane skipper is known are sites within an area roughly 23 miles (37 kilometers) long and 5 miles (8 km) wide in the South Platte River drainage of Colorado's Front Range. Much of the available habitat is within Pike National Forest; the rest is privately owned. Skippers usually are found within one mile (1.6 km) of a stream on steep, open, ponderosa pine woodlands.

ORV use within the butterfly's range has led to accelerated soil erosion, resulting in the loss of food plants. Other habitat damage may have occurred when Cheesman Reservoir was constructed and when communities within the skipper's range were developed. However, the main threat to the remaining skippers is the proposed Twin Forks Reservoir. Estimates of the amount of butterfly habitat that would be inundated range up to 50 percent, depending on the final impoundment size. Construction activities (roads, access points, maintenance facilities, etc.) and recrea-

tional development associated with the Twin Forks project could further degrade or eliminate even more of the habitat unless located away from prime skipper areas.

A U.S. Army Corps of Engineers (COE) permit would be needed for the Twin Forks project. While additional research is being conducted to better determine the degree of threat to the skipper from the planned reservoir, the FWS will work with the COE, the U.S. Forest Service, and all other involved parties in an effort to conserve the butterfly and its habitat while accommodating project goals to the greatest extent possible. Because printing the maps and detailed habitat descriptions required for a Critical Habitat proposal would make the skipper more vulnerable to collectors, such a designation was not deemed prudent at this time; however, a listing of the butterfly as Threatened would give it and its habitat protection under Section 7 of the Endangered Species Act.

Two Puerto Rico Plants

Cyathea dryopteroides (elfin tree fern) and *Ilex cookii* (Cook's holly), two plants endemic to elfin or cloud forests in the mountains of central Puerto Rico, were proposed for listing as Endangered (F.R. 9/26/86). Both species, which occur within small areas and in very low numbers, are in danger of extinction through direct destruction of the plants and loss of habitat.

A small tree fern, *C. dryopteroides* reaches only 24 inches (60 cm) high with a trunk one inch (2.5 cm) in diameter. It currently is known from populations totalling about 70 individuals on two mountaintops that are approximately 12 miles (20 km) apart. *I. cookii*, an evergreen shrub or small tree, has elliptical leaves that are leathery and dark green on the upper surface. It is thought to be dioecious, and therefore dependent on the existence of both male and female plants in close proximity to each other. The fact that male flowers and ripe fruit have never been observed suggests that production of viable seed rarely occurs. At present, only a single 8-foot (2.5 meter) *I. cookii* specimen with 4 small root sprouts has been documented from one of the species' two known mountaintop sites, and a small

number of sprouts or seedlings have been seen at the other.

Although both species occur on lands that are owned by the Commonwealth of Puerto Rico and managed as units of the Commonwealth Forest System, some sites on peaks and ridges have been cleared for construction after being leased to communications companies. A significant portion of the total *C. dryopteroides* population was destroyed by the development of a single communications installation on Monte Jayuya, and it is likely that some *I. cookii* individuals were lost when a similar facility was built on Puerto Rico's highest mountain, Cerro de Punta. Construction of new facilities, or even expansion of existing ones, could further deplete the surviving populations of *C. dryopteroides* and cause the extinction of *I. cookii*. Forests inhabited by both species also have been used as military training areas, resulting in additional damage to the relatively fragile habitat. Road construction and the indirect effects of such work (e.g., slope instability) in the vicinity could pose further threats.

Both species are attractive and could have potential value as ornamental plants; moreover, considerable commercial trade in some tree fern species already exists. Accordingly, the FWS decided against pointing out the location of the surviving populations with a designation of Critical Habitat. If they are listed, however, the plants and their habitat will receive Section 7 protection against jeopardy from Federal activities. The only Federal agencies whose actions might be expected to affect the plants are the U.S. Army (military exercises) and the Federal Highway Administration (road construction and maintenance). Through careful planning, adverse impact to the two species should be minimal.

Available Conservation Measures

Among the conservation benefits provided to a species if its listing under the Endangered Species Act as Threatened or Endangered is approved are: protection from adverse effects of Federal activities; prohibitions against certain practices; the

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Regional News

Endangered Species Program regional staff members have reported the following activities for the months of September and October:

Region 1—Numerous specimens of the golden paintbrush (*Castilleja christii*) were

found recently on U.S. Forest Service (USFS) lands near Mount Harrison in central Idaho. The Conservation Agreement made with the USFS a few years ago as an alternative to listing the species ap-

pears to have successfully eliminated the threats to its survival.

The World Center for Birds of Prey (The Peregrine Fund) reported that three peregrine falcons (*Falco peregrinus*) were fledged at a nest site near Cascade, Idaho. At two other sites, however, six young were lost to golden eagle predation.

The Fish and Wildlife Service (FWS) met with representatives of the U.S. Army Corps of Engineers and Port of Coos Bay at Senator Hatfield's Portland Office to discuss the results of peregrine falcon surveys that were done in conjunction with plans for a new road corridor to the north of Coos Bay. The FWS concluded that the surveys were adequate to allow an assessment of project impacts, and the Corps indicated that it would likely request formal consultation when a public notice is issued for the project.

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Various species of fish upon which the Endangered bald eagle (*Haliaeetus leucocephalus*) preys were collected from the Willamette River in northwest Oregon. Samples will be sent to FWS laboratories to determine the levels of chlorinated hydrocarbons, trace elements, and polychlorinated biphenyls (PCB's) in these fish. These samples have been collected as part of a study to determine why the breeding success of bald eagles in the Willamette River area is lower than the State average. FWS staff conducted the sampling in conjunction with Oregon Cooperative Wildlife Research Unit personnel.

A 32-foot boat will be transferred from Alaska to Region 1 for southern sea otter (*Enhydra lutris nereis*) law enforcement. The boat, appropriately named "R/V Sea Otter," will be needed to protect the otters if and when the translocation to San Nicolas Island is made, but a more immediate need is to investigate illegally set gill nets near Monterey, California. Apparently, nets are being set in closed areas (less than 15 fathoms) at night and being pulled before dawn. A number of otters have been found on the beach over the last 5 weeks that, according to State biologists, appear to have drowned in fishing nets.

The Hoover Dam refugium population of Devil's Hole pupfish (*Cyprinodon diabolis*) has been rather stable since the early 1970's, and its size has ranged from 35 to 75 individuals. Recently, however, the population declined to less than 10. Nevada Department of Wildlife personnel captured the remaining few individuals and

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Listings Approved for Four Animals and Five Plants

During September and October 1986, the following animal and plant taxa were added to the U.S. List of Endangered and Threatened Wildlife and Plants:

Concho Water Snake

The Concho water snake (*Nerodia harteri paucimaculata*) is a rare, non-venomous subspecies endemic to sections of the Concho and Colorado Rivers in west-central Texas. Because the proposed Stacy Reservoir would inundate parts of its free-flowing riverine habitat and dry out other parts, the snake was proposed January 22, 1986, for listing as Threatened (see story in BULLETIN Vol. XI No. 2). The final listing rule was published in the September 3, 1986, *Federal Register*. A final decision on designating Critical Habitat was delayed pending further review, but the decision should be published no later than January 1988. In the meantime, Fish and Wildlife Service (FWS) biologists are working with the project sponsors in an attempt to find a way to accommodate project goals while ensuring the snake's conservation.

Nashville Crayfish

Apparently extirpated from three other watersheds, the Nashville crayfish (*Orconectes shoupi*) currently is known to survive only in the Mill Creek drainage within Davidson and Williamson Counties, Tennessee. Degradation of water quality resulting from urbanization threatens the crayfish with extinction, and the FWS proposed January 24, 1986, to list it as Endangered (see summary in BULLETIN Vol. XI No. 2). The final listing rule was published in the September 26 *Federal Register*.

Dismal Swamp Shrew

A rare subspecies of the southeastern shrew (*Sorex longirostris*), the Dismal swamp shrew (*S. l. fisheri*) essentially is restricted to the Dismal Swamp National Wildlife Refuge in southeastern Virginia and adjacent portions of the swamp in North Carolina. The swamp has undergone extensive environmental changes in the recent past—in fact, the original swamp (more accurately described as a wooded peat bog) has been reduced in size by roughly 85 percent since the turn of the century. Some of these changes favored a related subspecies (*S. l. longirostris*), which is more common and is invading the Dismal Swamp shrew's habitat. Interbreeding between the two would render the Dismal Swamp shrew genetically extinct. For this reason, *S. l. fisheri* was proposed on July 16, 1985, for listing as Threatened (see BULLETIN Vol. X No. 8).

The final rule was published September 26, 1986. An overall management plan for the refuge is under development, and it will incorporate management practices to benefit the Threatened shrew.

Loach Minnow

A small desert fish, the loach minnow (*Tiaroga cobitis*) once occurred in the Gila River system upstream of Phoenix in Arizona, New Mexico, and Mexico (State of Sonora). This species, however, has been extirpated from Mexico and reduced to a fragmentary distribution in the remainder of its range. Impoundments, water diversions, ground water pumping, channel downcutting, and sedimentation have degraded or completely eliminated much of the historical habitat. The spread of exotic predatory and competing species also has played a part in the loach minnow's decline. These factors continue to threaten the fish. Accordingly, it was proposed June 18, 1985, for listing as Threatened (see BULLETIN Vol. X No. 7), and the final rule was published in the October 28, 1986, *Federal Register*. A decision on the original Critical Habitat proposal has been postponed until June 1987 in order to gather additional data on economic impacts.

Hawaiian Plant

Abutilon menziesii, also known as the ko'olua'ula, is a vulnerable species of shrub that apparently has been reduced in numbers to three small populations on Lana'i, Maui, and O'ahu in the Hawaiian Islands. Approximately 65 plants are known to survive in the wild. Much of the habitat in which this plant once grew was cleared for agriculture, with these lands often abandoned in subsequent years. Erosion has been, and continues to be, a major threat. The species also faces danger from fire, flooding, overgrazing by feral livestock, and defoliation by the introduced Chinese rose beetle (*Adoretus sinicus*). The plant was proposed on July 16, 1985, for listing as Endangered (see BULLETIN Vol. X No. 8), and the final rule was published September 26, 1986.

Alabama Leather Flower

The Alabama leather flower (*Clematis socialis*) is a rare perennial plant known from two very small sites along roadsides and adjacent woodlands in St. Clair and Cherokee Counties, northeastern Alabama. It is believed to be extremely vulnerable to extinction because of its restricted range and proximity to highways. Threats to its survival include herbicide application and mechanical scraping associated with roadside right-of-way maintenance, en-

croaching development, logging, and conversion of habitat to pasture. This plant was proposed December 6, 1985, for listing as Endangered (see BULLETIN Vol. XI No. 1), and the final rule was issued September 26, 1986. Highway crews are now working with the FWS at both sites to find rights-of-way maintenance techniques that are compatible with conservation of the leather flower.

Three Florida Shrubs

The beautiful pawpaw (*Deeringothamnus pulchellus*), Rugel's pawpaw (*D. rugelii*), and four-petal pawpaw (*Asimina tetramera*) are shrubs that have disappeared from most of their historical range, and now can be found only in a few small areas of southern Florida. Much of the remaining habitat of these plants is vulnerable to urbanization and other changes. All three were proposed for listing on November 1, 1985 (see BULLETIN Vol. X No. 11), and they were listed as Endangered on September 26, 1986.

These listed animals and plants are now protected under the Endangered Species Act, the terms of which are summarized in this BULLETIN at the end of the story on species newly proposed for listing.

BULLETIN Available by Subscription

Although we would like to send the BULLETIN to everyone interested in endangered species, budgetary constraints make it necessary for us to limit general distribution to Federal and State agencies and official contacts of the Endangered Species Program. However, the BULLETIN is being reprinted and distributed to all others, on a non-profit subscription basis, by the University of Michigan. To subscribe, write to the *Endangered Species Technical Bulletin Reprint*, School of Natural Resources, University of Michigan, Ann Arbor, Michigan 48109-1115, or telephone 313 763-1312. The price for 12 monthly issues is \$12.00 (in Canada, \$17 US).

Correction

The photograph of the jaguarundi in BULLETIN Vol. XI No. 8-9 should have been credited to Curtis Carley. We regret the error.

Changes in Grizzly Bear Regulations

A revision of the special regulations for management and protection of the Threatened grizzly bear (*Ursus arctos*) in the conterminous United States was published recently by the FWS (F.R. 9/23/86). It involves: (1) a new requirement to report taking of grizzlies to regional FWS agents and to Indian Tribal authorities; (2) the addition of Tribal authorities to those persons allowed to take grizzlies under specified conditions; (3) a stipulation that grizzlies taken in self-defense cannot be possessed or moved, except by authorized Federal, State, or Tribal personnel; and (4) an adjustment of the boundaries and quotas for the State grizzly hunting season in northwestern Montana.

The first three of the above changes were designed to facilitate monitoring of bear deaths and to recognize the role of Tribal authorities in grizzly management. The fourth adjusts the previous grizzly hunting regulations. Current data indicate that grizzlies in certain parts of northwestern Montana are declining and should not be hunted, but that increasing grizzly numbers elsewhere are leading to problems that pose a risk to the main grizzly population. Therefore, the revised rule stops hunting in some areas, opens it in others, and prohibits it altogether once the known total number of grizzlies killed in one year from all human-induced causes within the range of the main population (exclusive of Glacier National Park) reaches 14, or once the number of female grizzlies killed reaches 6.

Background

The grizzly bear originally occurred throughout western North America from Alaska to central Mexico. Its populations in the conterminous U.S. are now apparently restricted to northwestern and northeastern Washington, northern and eastern Idaho, western Montana, and northwestern Wyoming (Yellowstone Ecosystem). Fewer than 1,000 individuals are thought to survive in these areas, most of them in northwestern Montana. On July 28, 1975, the FWS listed the grizzly in the conterminous U.S. as Threatened. Special regulations issued in conjunction with that determination, as incorporated into 50 CFR 17.40(b), provided general protection to the species, but allowed taking under certain conditions to defend human life, eliminate nuisance animals, and carry out research. In addition, a limited sport hunting season was authorized in a specified portion of northwestern Montana, which has the largest grizzly population in the conterminous 48 States. Hunting was to cease when 25 grizzlies were killed in any one year for any reason.

These grizzlies belong to the Northern Continental Divide Ecosystem (NCDE), which includes Glacier National Park; the Flathead National Forest and adjoining portions of the Helena, Kootenai, Lewis and Clark, and Lolo National Forests (including the Bob Marshall, Great Bear, Mission Mountains, and Scapegoat Wilderness Areas); and some adjacent Bureau of



Hunting of grizzly bears will be prohibited under the new regulations once the number killed within the quota area each year from all human-induced causes reaches 14, or once the number of female grizzlies killed reaches 6. Hunting, however, will be limited to a somewhat smaller area within the overall quota zone.

Land Management, State, private, and Indian Reservation lands. Based on a number of recent studies, the Montana Department of Fish, Wildlife and Parks has estimated the grizzly bear population of the NCDE to contain 549 individuals, of which 356 are found outside of Glacier National Park.

The FWS continues to believe a hunting season to be necessary in order to make the bears in the NCDE more wary, thereby reducing the number of grizzly/human conflicts. Such problems have been on the rise in the eastern front of the Rocky Mountains in Montana, and the trapping and relocation of depredating bears has met with only limited success. Meanwhile, the grizzly population to the west in the Mission Mountains is declining. Therefore, the hunting regulations were revised to eliminate hunting of grizzlies in the Mission Mountains while opening up more of the Rocky Mountain Front. Hunting remains prohibited in Glacier National Park.

In order to achieve recovery of the grizzly bear in the NCDE, hunting levels must be kept within certain limits designed to allow for an increase in the overall grizzly population. Computer simulations indicate that, if 6 percent of the NCDE grizzly population (21 bears) dies each year from human-related causes, the population can still experience a general increase in numbers. When the estimated illegal take of seven grizzlies annually was subtracted, the annual legal kill limit for the NCDE was set at 14 grizzlies.



In order to reduce the likelihood of female grizzly bears being shot, there will be no hunting under the new regulations of adult grizzlies accompanied by young, as such grizzlies would probably be female.

New Hope for the Southern Sea Otter

*Editor's note: A proposal to establish an experimental population of the southern sea otter (*Enhydra lutris nereis*), now listed as *Threatened*, was published in the August 15, 1986, Federal Register. In last month's BULLETIN, Wilbur (Skip) Ladd, Project Leader of the FWS Office of Sea Otter Coordination in Sacramento, California, gave an overview of the events leading up to the sea otter translocation proposal. The following conclusion of his account highlights the proposal itself.*

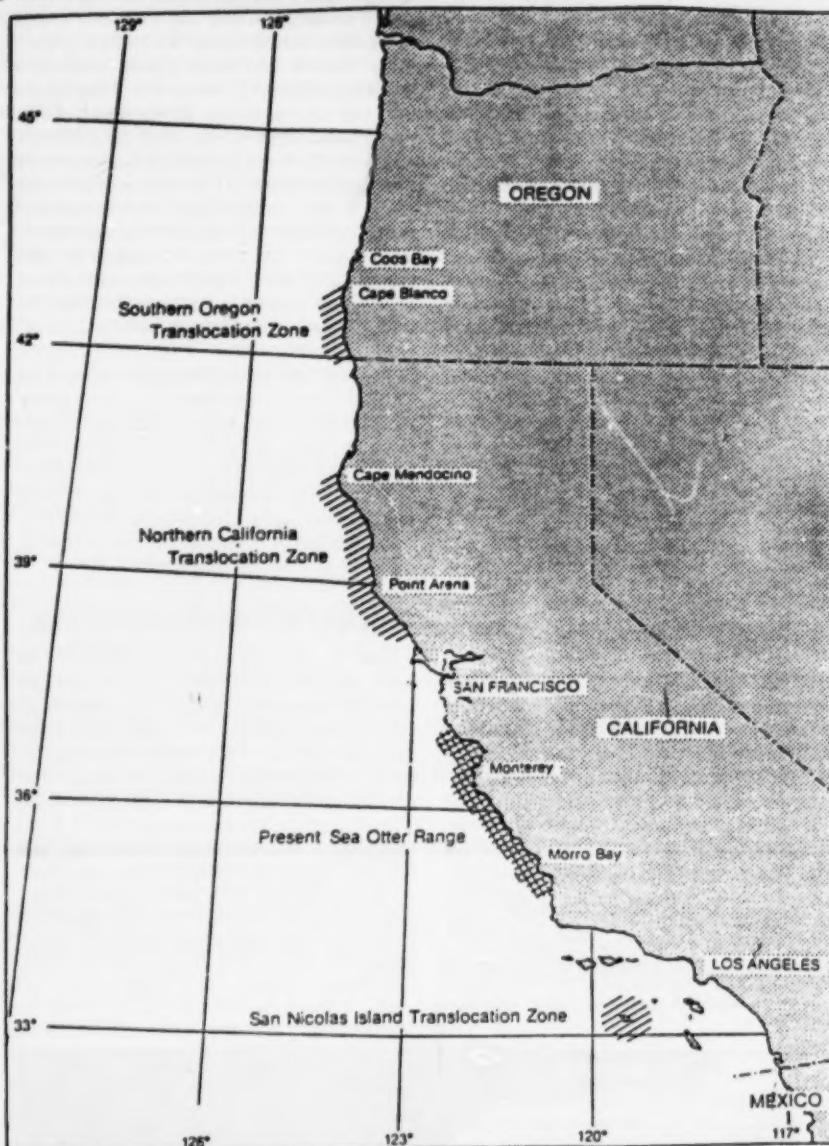
The very suggestion of establishing a second population of sea otters off California stimulated a great deal of public interest across the State. For this reason, the Fish and Wildlife Service (FWS) embarked years ago on an arduous public involvement process, which began in 1981. The FWS, working through a private contractor, synthesized as much information as possible on all potential translocation sites along the continental West Coast. Representatives from all major agencies and interest groups were included in a technical review team. The so-called "mapping study" summarized the available data on habitat suitability, potential conflicts with shellfisheries, oil spill risks from offshore oil development and tanker transportation, the capability of the habitat to serve as a natural barrier to dispersal of otters (i.e., to contain the new population), ease of protecting and conducting research on a new colony, and historical presence and abundance of sea otters.

Four zones were identified as having the greatest potential for a successful translocation: 1) San Nicolas Island, the most distant of the Channel Islands off southern California; 2) the northern coast of California; 3) the southern coast of Oregon; and 4) the northern coast of Washington. The study was completed and published in 1984.

In June 1984, the FWS also officially kicked off the National Environmental Policy Act process by publishing a Notice of Intent to prepare an Environmental Impact Statement (EIS) and proposed rule for establishing an experimental population of southern sea otters. Next, public scoping meetings were held. All major interest groups—including environmental organizations, the oil industry, and sport and commercial fisheries interests—were represented on an interagency review team and were provided with preliminary drafts of the EIS and proposed rule upon which to comment. The review process has been most interesting, and has taken all of 2 years to get to where we are now.

Translocation Proposal

So where are we now? On August 15, 1986, the notice of availability of the draft EIS and the proposed rule to establish an experimental population of California sea



location of southern sea otter's current range (crosshatched) and potential translocation sites

otters at San Nicolas Island were published in the *Federal Register*.

The proposal looks like this: Beginning in August 1987, FWS National Ecology Center biologists, in conjunction with biologists from the California Department of Fish and Game, would move (or "translocate") up to 70 mostly immature California sea otters from the current population to San Nicolas Island, the preferred site. The initial group would be closely monitored and, if a substantial number were to disperse from the island or die, additional otters may be transported there in subsequent years. No more than 70 would be taken from the donor population in any one year, and no more than 250 in total would be moved, although it is highly unlikely that

anywhere near this maximum number would ever be translocated. A law enforcement patrol officer would be assigned to protect the new colony full time, at least for the first 3 to 5 years after the translocation effort begins.

Once the otters are at the island, an intensive, long-term research effort would be carried out to document population dynamics of the experimental population as it grows toward the carrying capacity of the habitat, which is estimated to be somewhere between 280 and 1,000 animals. Concurrently, a variety of studies would be conducted to document changes in the nearshore marine ecosystem, such as effects on shellfish species composition

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Sea Otter

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and population size, changes in the kelp forest, and impacts on associated populations of finfish.

One purpose of such a translocation project, in addition to establishing a reserve sea otter breeding colony for recovery purposes, is to better document the characteristics of a sea otter population when it is within its "optimum sustainable population" level. This is important because sea otters are also protected under the Marine Mammal Protection Act (MMPA), which requires that populations be restored to their optimum sustainable levels consistent with maintaining the health and stability of the marine ecosystem. In order to determine the optimum sustainable population for California sea otters, information is needed on habitat carrying capacity and maximum productivity. If San Nicolas is ultimately selected as the translocation site, the research could be carried out in an almost perfect natural laboratory.

Sea Otter Containment

Another critical component of the translocation proposal is the FWS commitment to contain the experimental sea otter population at San Nicolas. Because of the potential for otters diminishing important commercial and sport shellfisheries in other parts of southern California, as well as adversely affecting other uses of the area (such as oil development), the proposal includes a designated management (or "no otter") zone. In simple terms, this means that any sea otter found in near-shore waters off southern California south

of Point Conception, including all the islands of the southern California Bight (except San Nicolas) and the mainland coast to Mexico, would be removed using non-lethal means, and either placed back into the translocation zone at San Nicolas or into the range of the donor population along the central coast. This containment effort would minimize adverse impacts of the translocation on shellfisheries; however, it also would prevent the natural range expansion of the current population into southern California. It is expected that the range of the current population would otherwise reach southern California through natural expansion within 10 to 20 years.

This containment strategy amounts to a form of "zonal management," a strategy that the State, the Marine Mammal Commission, and many fisheries advocates have been urging the FWS to undertake. The trade-off: a reserve sea otter colony established at San Nicolas but no natural reoccupation of historical habitat in the remainder of southern California.

Proposed Translocation Site

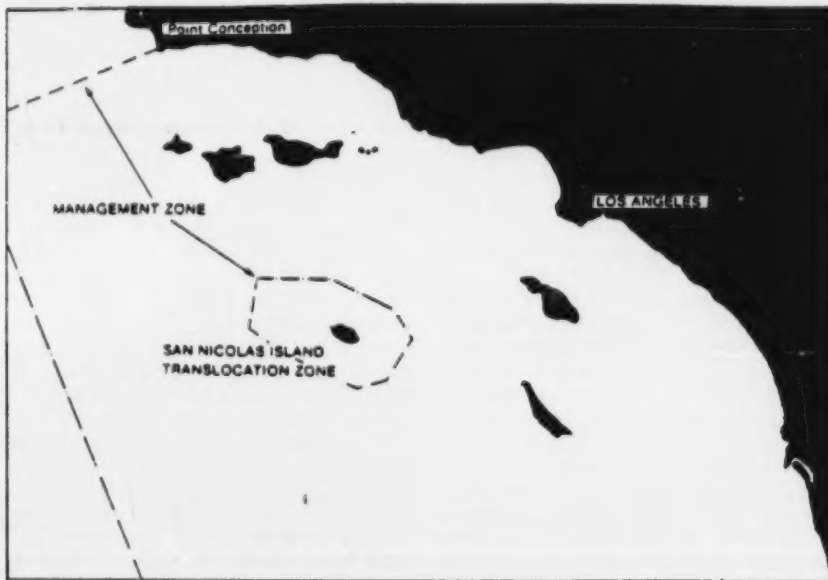
San Nicolas Island is believed to be almost ideal for sea otter containment as well as research. Located 62 miles (100 kilometers) offshore, it is separated from the mainland and the other Channel Islands by wide, deep ocean expanses that are generally devoid of sea otter food within normal foraging depths (15-20 fathoms). It is also 24 miles (39 km) from the tiny island of Santa Barbara and over 40 miles (64 km) from the northern Channel Islands, where much of the important southern California shellfishing takes place.

Rich in shellfish resources itself, San Nicolas would provide excellent habitat for a new sea otter colony. This, however, is precisely why some people are opposed to moving otters there. San Nicolas supports healthy commercial and sport fisheries that we predict will be significantly reduced or lost once the otters occupy the near-shore habitat around the island. The combined net value of these fisheries is conservatively estimated to be nearly \$200,000 per year, which represents about 11 percent of the abalone and lobster fishery and 2 percent of the sea urchin fishery of southern California. Fishermen contend that even this figure far underestimates the value of the fishery.

On the plus side of the economic ledger, marine scientists speculate (with some evidence) that sea otter predation on the expansive populations of sea urchins will reduce heavy urchin grazing on kelp. This could allow new kelp beds to flourish and provide not only a larger crop of kelp for commercial harvest but also a much greater diversity and number of finfish and other species associated with the kelp forest community. In fact, marine ecologists preparing the draft EIS on translocation have calculated that the kelp canopy around San Nicolas may increase by 45 percent or more with sea otter reintroduction.

Legal Authority

Translocations of listed species are authorized under the terms of Section 10(j) of the Endangered Species Act (ESA), which addresses the establishment of experimental populations. However, Congress recently passed legislation (PL 99-625) that specifically authorizes and sets the ground rules for translocation of California sea otters. The key points are that the FWS must develop a translocation plan by regulation that includes the following: (1) the number, age, and sex of sea otters to be located; (2) the methods for capture, translocation, release, monitoring, and protection; (3) the specification of a "translocation zone" where otters will be relocated, plus a buffer area, with formal Section 7 consultations required in the zone for all Federal activities except those that are defense-related (the U.S. Navy controls San Nicolas); (4) the specification of a "management zone," which would surround the translocation zone but would not include the existing sea otter range or adjacent areas where expansion is needed for the species' recovery; (5) measures, backed up by an adequate funding mechanism, to isolate and contain the experimental population; (6) a detailed description of the relationship of translocation to the status of the species and to future Section 7 determinations relative to either the parent population or the experimental population; and (7) a provision that the plan



proposed San Nicolas Island translocation and management zones

(continued on next page)

Sea Otter

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would be administered in cooperation with the State.

The management zone is to be kept free of otters using nonlethal means, no formal Section 7 consultations will be required (only conferences), and incidental take of otters resulting from otherwise legal activities will not be a violation of the ESA or MMPA.

Numerous compromises have been made by various interest groups and agencies to get to this point. The new law generally represents a delicate consensus

among the major agencies and organizations on how the translocation should proceed, if it proceeds at all. If the project is ultimately carried out, probably no one will be perfectly pleased, but all should feel they had some say and got some consideration of their views.

In addition to the proposed action of translocating California sea otters to San Nicolas Island, the draft EIS evaluates five other alternatives, including:

- (1) translocation to the northern California coast;
- (2) translocation to the southern Oregon coast;
- (3) translocation to any one of the three sites (San Nicolas, northern California, southern Oregon) and, as a miti-

gation measure, stopping range expansion of the current population into southern California below Point Conception;

(4) giving additional protection to the existing population without a translocation; and

(5) no action.

The public comment period on the draft EIS and proposed rule ended November 17. Public hearings were held in Brookings, Oregon; Monterey, California; and Ventura, California. Depending on the complexity of public comments, we hope to issue a final rule and EIS by April 1987 and to implement the selected alternative in fall 1987.

Proposed Listings

(continued from page 1)

requirement for the FWS to develop and implement recovery plans; the authorization to seek land purchases or exchanges for important habitat; and the possibility of Federal aid to State or Commonwealth conservation departments that have signed Endangered Species Cooperative Agreements with the FWS. (Both Colorado and the Commonwealth of Puerto Rico have such agreements.) Listing also lends greater recognition to a species' precarious status, which encourages further

conservation efforts by State and local agencies, independent organizations, and individuals.

Section 7 of the Act directs Federal agencies to use their authorities to further the purposes of the Act by carrying out conservation programs for listed species. It also requires these agencies to ensure that any actions they authorize, fund, or carry out are not likely to jeopardize the survival of a listed species. If an agency finds that one of its activities may affect a listed species, it is required to consult with the FWS on ways to avoid jeopardy. For species that are *proposed* for listing and

for which jeopardy is found, Federal agencies are required to "confer" with the FWS, although the results of such a conference are non-binding.

Further protection is authorized by Section 9 of the Act, which makes it illegal to take, possess, transport, or traffic in listed animals, except by permit for certain conservation purposes. For plants, the rule is different; the prohibition against collecting applies only to listed plants found on lands under Federal jurisdiction. Some States, however, have their own laws against take of listed plants.

Regional News

(continued from page 2)

temporarily placed them in aquaria until the refugium is cleaned and renovated.

The FWS Great Basin Complex at Reno, Nevada, recently completed a report that concerned the effect of operational procedures and equipment at the Marble Bluff Fish Facility on the health of cui-ui (*Chasmistes cujus*) and the safety of the facility's personnel. It also listed recommendations for solving health and safety problems before next year's spawning run. This report was an accumulation of ideas and recommendations from a brainstorming session held at the complex between FWS and Bureau of Reclamation personnel, who also assisted with the facility operations this year. Three approaches were developed for reducing cui-ui deaths and improving personnel safety.

The efforts to set aside a major Endangered species preserve for the San Joaquin kit fox (*Vulpes macrotis mutica*), blunt-nosed leopard lizard (*Gambelia silus*), giant kangaroo rat (*Dipodomys ingens*), and California condor (*Gymnogyps californianus*) in the Carrizo Plain area are

moving forward. At a recent steering committee meeting, representatives of the involved oil companies committed to produce an initial draft of a plan that could be used as the basis for a Habitat Conservation Plan (HCP). At another meeting, the Bureau of Land Management, The Nature Conservancy, and the FWS decided to jointly prepare an acquisition study which will direct efforts to acquire the Carrizo Plain preserve.

An intensive field survey located 12 breeding pairs of the San Clemente Island loggerhead shrike (*Lanius ludovicianus meamsi*) in 1986. A total of 16 young were produced. The researchers are confident that all existing pairs were located this year. The current total adult population of 24 represents a decline from a minimum population size of 28 birds in 1985.

California's San Luis Obispo County Board of Supervisors unanimously approved funds for the preparation of the Morro Bay Kangaroo Rat (*Dipodomys heermanni morroensis*) Habitat Conservation Plan. Interim guidelines for developing several single family homes on existing parcels in the species' Critical Habitat also were tentatively approved.

Several new populations of the Belkin's dune tabanid fly (*Brennania belkini*), a Category-2 listing candidate, have been found within an area of the Los Angeles Airport and in the adjacent dunes. This area has been proposed for development.

The Sacramento, California, Endangered Species Office (SESO) and the California Department of Fish and Game recently developed a draft Memorandum of Understanding to maintain the Owens tui chub's (*Gila bicolor snyderi*) recently designated Critical Habitat at the Hot Creek Hatchery. Results of a study to determine the Owens tui chub's habitat preferences will serve as the foundation for future development of a long-term management plan for the species.

In October, efforts to restore habitat of the valley elderberry longhorn beetle (*Desmocerus californicus dimorphus*) were initiated on two areas of the American River Parkway in Sacramento County, California. The SESO assisted in identifying the rehabilitation sites, which largely consist of exotic star thistle.

A new population of the valley elderberry longhorn beetle has been documented

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from along the Cosumnes River in Sacramento County. California Department of Fish and Game and FWS biologists had found suitable habitat along the Cosumnes River earlier this year. An adult specimen collected by a county agricultural agent during the mid-1960's has been positively identified as belonging to this rare species.

Recent surveys revealed that the San Francisco garter snake (*Thamnophis sirtalis tetrataenia*) makes limited use of the upland areas around the westernmost wetland habitat that is the site of the proposed Mori Point Condominiums. A plan will be developed to protect the sensitive areas on this site, which is located in San Mateo County, California.

The Marina City Council (California) will prepare a Habitat Conservation Plan for the coastal dune habitats in Monterey County that lie between Fort Ord and the mouth of the Salinas River. The prospective HCP will primarily address the Endangered Smith's blue butterfly (*Euphilotes enoptes smithi*) and will include conservation measures for the following plants and animals that are candidates for listing: Menzies' wallflower (*Erysimum menziesii*), Monterey Bay slender-flowered gilia (*Gilia tenuiflora* ssp. *arenaria*), pungent spineflower (*Chorizanthe pungens* var. *pungens*), and the black legless lizard (*Anniella pulchra nigra*).

A survey to determine bald eagle productivity at the Anderson Ranch and Cascade Reservoirs in Idaho showed that five nests, four new and one historic, fledged five young in 1986. There are now 26 occupied nests in Idaho, only 5 nests away from the recovery goal of 31.

As the Boise, Idaho, Endangered Species Field Office recommended, an ordinance to prohibit development within 1,500 feet of the South Fork Snake River was approved by Bonneville County. This area is particularly important to bald eagle and peregrine falcon recovery efforts in the greater Yellowstone ecosystem.

Region 2—According to the field project leader, this year's conservation effort on the Kemp's ridley sea turtle (*Lepidochelys kempii*) nesting beach at Rancho Nuevo, Mexico, was very successful. An unusually high hatching rate of 80 percent from protected nests at Rancho Nuevo is expected this year; 572 nesting females were encountered, which is slightly more than last year. Eggs were taken again this year for transplanting and imprinting on the

beaches at Padre Island, Texas. The hatch rate of Padre Island eggs (88 percent) remains quite high, due to the special handling and conditions.

The Trawling Efficiency Device, also known as the Turtle Excluder Device or TED, that has been under development and testing by the National Marine Fisheries Service (NMFS) for the last nine years may finally be put in the field. Regulations requiring the use of TEDs on shrimp trawls being towed where sea turtles are found are now being drafted by NMFS. However, conservation groups are worried that NMFS will only require TEDs in some areas or will continue to argue for voluntary cooperation by shrimpers, with mandatory use in the distant future.

Based on NMFS's estimates of 11,000 turtles killed per year, nearly 100,000 Endangered sea turtles, including about 7,000 Kemp's ridleys, may have been killed by the huge trawling fleet during the last nine years. This mortality level is important to all species, but is critical to the Kemp's ridley because researchers estimate that this species' population has declined to only 500-600 nesting females.

The TED works; it excludes turtles and also 50-70 percent of the by-catch (fish, horseshoe crabs, and big jellyfish). In the Gulf of Mexico alone, 1.5 billion pounds of fish are discarded every year by shrimp trawlers. The TED may even increase the shrimp catch. It will help shrimpers by reducing the sorting that needs to be done on deck and by effectively aiding them to keep within the law under the Endangered Species Act. It will also help the turtles by reducing the single greatest cause of turtle deaths in the Gulf of Mexico and southeast Atlantic.

Richard Byles, a sea turtle biologist, recently joined the endangered species staff in Region 2. He comes to the FWS with 12 years of experience with sea turtles in Florida, the mid-Atlantic States, and Mexico. For the past 6 years, he has worked on his doctorate at the Virginia Institute of Marine Science using biotelemetry to clarify the movements and behavior of sea turtles. Richard will be developing satellite tracking programs for the Kemp's ridley and other species of sea turtles.

During the past maternity season, two female Ozark big-eared bats (*Plecotus townsendii ingens*) were equipped with 0.7-gram radio transmitters as part of a test to determine the feasibility of using radio telemetry as a tool in the recovery of this species. The test was conducted only after handling and radio attachment techniques were developed on a similar, but unlisted, subspecies of big-eared bat. Preliminary results reported by the Oklahoma Cooperative Fish and Wildlife Research

Unit indicate that telemetry may be a limited management method on this species due to the short range of the small radio. The two bats did not seem encumbered by the transmitters and appeared to fly and roost normally. The glue attaching the transmitters allows the radios to fall off the bats after a few weeks. The battery life of the radios is only 7-10 days.

On September 20, 13 thick-billed parrots (*Rhynchopsitta pachyrhyncha*), 7 males and 6 females, were released into the Chiricahua Mountains of southeastern Arizona. Neck-collar radios were attached to six of the birds. The birds were held in flight cages at the release site 4 weeks in preparation of the release. Intensive observations for several days after the release indicated that the parrot's flights were strong, the flock's cohesion and social interaction appeared normal, and the birds responded appropriately to potential predators.

A second release of wild adult thick-billed parrots was made on October 19, also in the Chiricahua Mountains. Of the 16 birds released, 5 were equipped with radio transmitters. A few hours after release, most of the birds began associating with the flock of 10 parrots still present in the area from the initial release. A total of 22 birds fed together and roosted together that night. During the following week, the flock remained together, staying within a 5-mile radius of the release site and foraging mostly on wild foods (Mexican pinyon and Chihuahuan pine seeds). The birds have been drinking from potholes on top of nearby cliffs, and spending the nights in dense pine foliage.

Thick-billed parrots were once native to southeastern Arizona, although they have not been regularly observed since the mid-1930's. Habitat destruction, primarily logging, in the Sierra Madre Occidental of western Mexico continues to threaten the remaining wild populations.

All of the birds had been confiscated by FWS law enforcement agents as they were being illegally imported from Mexico as wild adults. If additional confiscated wild (as well as captive-reared) thick-billed parrots become available, this experimental reestablishment effort may continue for several years. The U.S. Forest Service, the Arizona Game and Fish Department, and the FWS are now in the process of entering into a cooperative agreement for the project.

Over 300 duplicate, 30-second public service announcements about whooping cranes (*Grus americana*) were distributed in 13 States for use by television and radio stations. The announcements were developed by the FWS Public Affairs Office in Region 2, in cooperation with the National Audubon Society and Edison Electric In-

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thick-billed parrot

stitute. The announcements are for use during the fall and spring whooping crane migration and should be useful for several years. The tapes describe identification features of whooping cranes, mention that they are Endangered and protected, note that they may be migrating through the viewer's area, and encourage observers to report sightings to wildlife agency personnel.

Other whooping crane educational efforts accomplished recently in a 13-State area include distribution of (1) the National Audubon Society's leaflet "Is It a Whooping Crane?"; (2) news releases about the pending migration and a description of chick production this summer; (3) reward signs that illustrate a whooping crane, sandhill crane, and snow goose, compare identification features of the three, and note that there is a reward for information leading to the arrest and conviction of anyone harassing, shooting, or attempting to take a whooping crane; (4) the Central Flyway Waterfowl Council bulletin, "Waterfowl Identification in the Central Flyway," which includes a section about identification of whooping cranes and birds similar in appearance; and (5) information about whooping cranes to be included with the

Federal permit required for all sandhill crane hunters.

An experimental sandhill crane hunt was held in the Middle Rio Grande Valley for the first time since 1916. Hunting occurred October 16-31 and was by special permit only. Each hunter had to complete a bird identification training course and pass a test before receiving a hunting permit. Over 500 hunters participated and voluntarily checked about 350 cranes at the checking stations. Three whooping cranes arrived in the valley before the hunt ended, but they remained on State and Federal lands that were closed to hunting.

About 1,300 masked bobwhite (*Colinus virginianus ridgwayi*) chicks were released on the Buenos Aires National Wildlife Refuge in Arizona during the past three months. An additional 400 birds were scheduled for release shortly thereafter. Most masked bobwhites were released with sterilized, wild, adult male Texas bobwhite (a related but non-endangered subspecies) foster parents, but a few were fostered to wild, adult scaled quail (also unlisted). Sightings of adult masked bob-

whites on the new refuge indicated good survival from last year's releases.

Proceedings of the December 1984 symposium on masked bobwhite biology and conservation, sponsored by the Arizona Game and Fish Department, National Audubon Society, and FWS, have been published and are available from the above agencies.

Texas A&M University, in cooperation with the FWS, has begun monitoring Navasota ladies'-tresses (*Spiranthes parksii*) populations. This Endangered orchid is a native of east Texas and is threatened by taking and by industrial, commercial, and residential development. The monitoring program, which will continue for several years, entails marking individual plants in the spring and checking for their presence during the fall flowering period. The monitoring of this unique orchid will lead to a better understanding of its population dynamics and to the development of proper management techniques.

Latest inventories show that the re-introduction of Knowlton's cactus (*Pediocactus knowltonii*) has been successful. Both groups of transplants—one planted in the fall of 1985, the other in the spring of 1986—had an overall survival rate of 94.7 percent. Most transplanted individuals showed an increase in stem diameter, 62 percent of the plants flowered, and 11 percent set fruit. These results indicate that transplanting is a potentially successful recovery technique for this species. For comparative purposes, twenty-four monitoring plots were established and inventoried at the type locality. Monitoring efforts at both sites will continue.

A public hearing was held in St. George, Utah, on September 15 concerning the proposed listing of the Virgin River chub (*Gila robusta seminuda*) as an Endangered species with Critical Habitat. (See story on proposed rule in BULLETIN Vol. XI No. 7.) Forty people attended the hearing and 13 presented information. About two-thirds of the presentations opposed listing, principally because of conflicts with economic development along the Virgin River.

Before and after the hearing, the Woundfin Recovery Team conducted its semiannual sampling effort on the Virgin River. The exotic red shiner (*Notropis lutrensis*) continues to move upstream into reaches once occupied only by native fish species. Another new threat to woundfin is a high rate of infestation of what appears to be Asian tapeworm. Collections directly below the outflow of the newly built Quail Creek Reservoir found only woundfin infected. Perhaps largemouth bass that were moved from Lake Mead carried in

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this new parasite. On the brighter side, Virgin River chubs have produced a very strong year class in 1986, the best in at least 3 years.

Biologists from the Bureau of Reclamation, Utah Division of Wildlife Resources, and FWS Regions 2 and 6 met in Durango, Colorado, to discuss conducting a fish survey of the San Juan River from Farmington, New Mexico, to Lake Powell. The San Juan River is a tributary of the Colorado River, flowing into what is now Lake Powell. Intensive sampling of the San Juan River will start in the spring of 1987. It is hoped that sampling results will provide information on the presence of rare fishes in the river, including the Endangered Colorado squawfish (*Ptychocheilus lucius*). Data will also be gathered on the potential use of the river for recovery of other listed or proposed Colorado River fishes.

Region 3—The twelfth annual Endangered Species Coordinators Meeting was held during the last week of October in Marshall, Indiana. Coordinators from the 8 States within Region 3 attended, as well as representatives from the Province of Ontario, Canada, the State of Arkansas, and the U.S. Forest Service. The primary purposes of the meeting were to review the efforts of the past year and plan strategies for the coming year.

In the Kirtland's warbler (*Dendroica kirtlandii*) research effort in Michigan this year, 27 warblers were trapped and color banded, and 6 were radio-tracked. One adult was followed for 9½ days, and five juveniles were tracked for up to 7 days. No problems were noted with the transmitters or the ability of the birds to carry them. Adults were noted to remain near the established territories, while the young tended to move about a mile or more from the nest area.

Approval was received for the Driftless Area acquisition project, which is designed to lay the foundation for efforts to protect the northern wild monkshood (*Aconitum noveboracense*) and the Iowa Pleistocene snail (*Discus macclintocki*). Several species that are candidates for Federal listing also will be protected.

The Illinois Department of Transportation reported the successful radiotracking of a juvenile female Indiana bat (*Myotis sodalis*) in Pike County, Illinois, using a 0.7 gram transmitter. No behavioral abnormalities were noted during the three-night tracking period. Day roosting was done in

the same bottomland cottonwood along an intermittent stream on both days. The bat exhibited a larger foraging range than had been expected from previous research, and preliminary indications are that the foraging was over corn and soybean fields. Mapping and a more detailed analysis of the bat's movements will be conducted.

The Regional Office staff, in conjunction with Regions 4 and 5, has been reviewing a petition to list the Appalachian Bewick's wren (*Thryomanes bewickii altus*), a Category-2 listing candidate, as an Endangered species. This bird appears to have surged into much of the Midwest in the late 19th century, and was common throughout the southern half of the region in the first decades of this century, but has dramatically diminished in the last few decades. Currently, Missouri has the only stable population in the Midwest. There is no known cause for the bird's decline.

Region 4—In an effort to determine the effectiveness of four types of the Trawling Efficiency Device (TED), the Georgia Marine Extension Service, utilizing the University of Georgia research vessel, *Georgia Bulldog*, conducted trawling activities off Cape Canaveral during August 12-23. The National Marine Fisheries Service, FWS, Florida Department of Natural Resources, South Carolina Wildlife and Marine Resources Division, Greenpeace and other organizations, universities, and agencies provided observers. A film crew from ABC's "20/20" news program was on board one day to film the trials.

Seventy-one sea turtles were captured; however, none were captured in nets equipped with TEDs. Finfish by-catch also was substantially reduced on nets with TEDs. A full report of the results and relative effectiveness of the different TEDs is being prepared by the Georgia Marine Extension Service.

Status surveys are being conducted, under contract through the Endangered Species Field Station in Jackson, Mississippi, for two Category-2 listing candidate species of freshwater mussels, *Arkansasia wheeleri* and *Lampsilis streckeri*. *A. wheeleri*, a monotypic genus, is known from the Little and Ouachita Rivers in Arkansas and the Kiamichi River in Oklahoma. Efforts to collect this species alive in the 1980's have not been successful. While the survey will cover the mussel's historic range, the Ouachita and Kiamichi Rivers offer the best opportunity for success.

L. streckeri is known from the Little Red River in Arkansas and possibly from Onion and Salado Creeks in Texas. The type locality on the Little Red River was inundated by Greers Ferry Reservoir. A 1985

survey of Little Red River headwaters by the Arkansas Natural Heritage Commission found some individual mussels that appear to be *L. streckeri*. Additional specimens are necessary, however, before sufficient comparisons to confirm the identification can be conducted. The Texas records of this uncommon mussel are from the 1800's, and museum specimens to support these records do not exist. The survey will attempt to document the accuracy of these old records; results are expected in 1987.

In August, staff members of the Jacksonville, Florida, Endangered Species Field Station visited the Avon Park Air Force Range in Polk and Highlands Counties to determine the effect of a proposed aircraft runway extension on the recently listed Florida grasshopper sparrow (*Ammodramus savannarum floridanus*). Because the habitat area that was in question is submarginal for the Endangered sparrow and is small in size, it was determined that there would be no effect on the species from the proposed activity.

The Avon Park Air Force Range is one of the more unique biological areas managed in the Southeast by the U.S. military. Proposed and listed Endangered and Threatened species occurring there include not only the grasshopper sparrow, but the Florida scrub jay (*Aphelocoma coerulescens coerulescens*), Audubon's crested caracara (*Polyborus plancus audubonii*), bald eagle, red-cockaded woodpecker (*Picoides borealis*), wood stork (*Mycteria americana*), and eastern indigo snake (*Drymarchon corais couperi*). The range contains over 100,000 acres of land, of which between 3,000 and 5,000 acres are valuable Florida scrub, a habitat rich in wildlife that has been widely destroyed elsewhere by agricultural and housing developments.

Because of what appears to be a rather high level of insect damage to flowers and seed capsules of the Endangered green pitcher plant (*Sarracenia oreophila*) within some colony sites, a recent study was initiated by the Endangered Species Field Station in Jackson, Mississippi. The study will be carried out under a research work order through the Alabama Cooperative Fish and Wildlife Research Unit, Auburn University. The purpose of the study is to identify the predator species, determine the extent of damage and effects on the plant's reproduction, and recommend specific management/control measures.

Current population estimates indicate that the status of the only population of the Perdido Key beach mouse (*Peromyscus polionotus trissyllepsis*) continues to be precarious. A survey conducted by Dr.

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Nick Holier at the Perdido Key unit of Gulf State Park in Baldwin County, Alabama, provided a population estimate of 20 beach mice. This estimate, determined by live-trapping and mark-recapture techniques, is considered by researchers to be conservative. Another population estimate of 31.75 was derived by a geometric estimator (a mathematical formula used in surveying); however, because tests of equal catchability of marked and unmarked individuals were not conducted, this estimate also should be viewed with discretion. In any event, the number clearly is small.

An interior least tern (*Sterna antillarum* *athalassos*) nesting survey was conducted in the lower Mississippi Valley during May, June, and July 1986. The surveyed area included Cape Girardeau, Missouri, down the Mississippi River to Baton Rouge, Louisiana, the confluence of the Arkansas and Mississippi Rivers along the Arkansas to the Oklahoma State line, and from the confluence of the Red and Mississippi Rivers up the Red to the Louisiana/Arkansas State line. Twenty-eight colonies, consisting of 2,188 terns (the high count of three surveys), were observed along the Mississippi River between Cape Girardeau and Greenville, Mississippi. Two colonies, consisting of 50 terns, were sighted on the Arkansas River. No terns were spotted on the Mississippi south of Greenville or on the Red River. Cooperating agencies for the survey include the U.S. Army Corps of Engineers (St. Louis, Memphis, Vicksburg, New Orleans, and Little Rock Districts); the Missouri Department of Conservation; the Arkansas Natural Heritage Program; the Mississippi Department of Conservation; and the FWS Jackson, Mississippi, Endangered Species Field Office.

Region 5—Surveys to determine breeding pairs of piping plovers (*Charadrius melodus*) along the U.S. Atlantic coast have been completed for the 1986 nesting season. Approximately 553 breeding pairs were estimated to occur from Maine to North Carolina. This represents about a 16 percent increase over 1984 estimates. It is believed, however, that the increase is due to more thorough surveys rather than an actual increase in breeding birds. More than 80 percent of all the known breeding pairs of this species on the east coast occur in Massachusetts, New York, New Jersey, and Virginia.

During the week of September 29 - October 3, a New England television station, WCVB—Channel 5, featured a five-part series on endangered species as part of its nightly news program. Regional species of interest covered in the series included three listed species, the piping plover,

Plymouth red-bellied turtle (*Pseudemys rubriventris bangsi*), and right whale (*Balaena glacialis*); a bird recently proposed for listing, the roseate tern (*Sterna dougalli dougalli*); and the Sand Plain gerardia (*Agalinis acuta*), a Category-1 listing candidate plant. Richard Dyer, endangered species biologist, served as regional contact for the series, which was seen by a large New England audience. Future programs on other regional species are being discussed.

The Eastern Peregrine Falcon Recovery Team met in Boise, Idaho, on October 15. Subjects discussed included the status of funding for 1987, nesting and reintroduction results of 1986, planning of a State coordinators meeting for January 1987, and management of "saturated populations" (populations in which there are more birds than available nesting habitat). The meeting also included a tour of the World Center for Birds of Prey, which supplies peregrine falcons for all three peregrine recovery programs now under way in the United States. The group also viewed the Snake River Birds of Prey Area, which has some of the densest nesting populations of golden eagles (*Aquila chrysaetos canadensis*) and prairie falcons (*Falco mexicanus*) in the U.S.

The State of West Virginia has entered into an Endangered Species Act Section 6 cooperative agreement with the FWS for plant conservation. Funding has been requested by the State to undertake conservation efforts for the running buffalo clover (*Trifolium stoloniferum*), a species that is currently proposed for listing as Endangered. (See story in BULLETIN Vol. XI No. 4.) Only four plants of this extremely rare species are known to survive in the wild.

Region 6—On August 27, personnel of the Wyoming Game and Fish Department (WGFD) met to review the current available data on black-footed ferrets (*Mustela nigripes*) to determine how many of the remaining wild ferrets should be taken for the captive breeding program. After reviewing all the data, they determined that too few ferrets remained near Meeteetse to prevent loss of this population. Therefore, they decided that all of the known wild ferrets near Meeteetse should be captured. This action had also been recommended by the Captive Breeding Specialist Group of the International Union for the Conservation of Nature and Natural Resources.

Trapping started on August 27 and will continue until all known ferrets have been captured. Newly captured animals are being placed in isolation to ensure that they are free of disease. After a period of isolation, the ferrets will be placed at the WGFD's new breeding facility at the Sybille Wildlife Research Unit near Wheat-

land, Wyoming. A new building is now being constructed for this facility.

As of September 22, a total of 11 ferrets (1 adult male, 3 juvenile males, 2 adult females, and 5 juvenile females) had been captured. These animals, combined with the 6 ferrets captured in 1984, have increased the captive population to 17. One known wild ferret near Meeteetse was not captured, but it is still believed to be occupying the study site. Efforts to locate and trap this ferret will be made when winter snow tracking conditions exist.

On August 25 and September 25, members of the Platte River Steering Committee met to discuss progress on the multi-State/agency effort to resolve Endangered species and water development issues on the Platte River in Wyoming, Colorado, and Nebraska. Of primary concern is to place greater emphasis on analyzing data and developing instream flow models to help answer specific questions. The relationships between Endangered birds, including the whooping crane, least tern, and piping plover, as well as other migratory birds, continue to be discussed.

Aerial surveys for the fall whooping crane migration began October 15. Whooping cranes have been sighted in Colorado, Kansas, Nebraska, Oklahoma, and Saskatchewan, Canada. The Canadian sighting is the only one of a single family group. The other sightings were of one and two birds.

Region 7—Over 2,000 river miles were surveyed for peregrine falcons in 1986. In addition to the four principal study areas described in the *Peregrine Falcon Recovery Plan-Alaska Population*, several smaller drainages and tributaries of major rivers were surveyed. Populations along the four study areas continue to increase. The upper Yukon, Colville, and Sagavanirktok River populations appear to be approaching pre-DDT levels, and the Tanana River population, the slowest of the four study areas to show signs of recovery, had the highest number of occupied sites since 1968.

Surveys of American peregrine falcons (*Falco peregrinus anatum*) in interior Alaska found 109 adult pairs and 205 young. North Slope surveys of Arctic peregrine falcons (*F. p. tundrius*) yielded 49 adult pairs and 69 young. Productivity for successful nesters averaged 2.44 and 2.65 for the interior and North Slope, respectively.

Two peregrines banded as nestlings in Alaska have been recovered so far this year. One, banded on the Charley River in 1985, was recovered in El Salvador in February 1986. The other was banded in

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1986 on the lower Yukon River and recovered in western Montana in September 1986.

A request for formal Section 7 consultation (under the Endangered Species Act) has been received from the U.S. Navy regarding the proposed construction and operation of a relocatable Over-the-Horizon (OTH) radar facility on Amchitka Island in the Aleutians. At issue is the effect of construction and operation of the facility on the Endangered Aleutian Canada goose (*Branta canadensis leucopareia*). Amchitka was the site of underground nuclear testing by the Atomic Energy Commission during the period 1965-1971 and it later served as the site for an Aleutian goose propagation facility. The island has been uninhabited since the FWS abandoned the propagation facility in 1980. The FWS' commitment of restoring Aleutian geese to this island dates back to 1949, when efforts began to rid Amchitka of introduced arctic foxes (*Alopex lagopus*). Since 1980, nearly 350 captive-raised and wild-caught Aleutian geese have been released on Amchitka Island.

Region 8 (Research)—Biologists at the Condor Research Center in Ventura, California, began trapping operations at the Hudson Ranch on September 4 to bring the remaining three wild California condors, all males, into captivity to add to the captive breeding program. As of November 30, no condors had been caught, although they had been sighted near the trap site.

Sipsey Fork, a stream in north-central Alabama, contains the largest known pop-

ulation of the flattened musk turtle (*Stenothorus depressus*), a species currently proposed for listing. (See BULLETIN Vol. X No. 12.) The stream was surveyed during July 1986 to determine the effects of a severe disease initially observed during surveys in 1985. In 1985, the population declined by 50 percent from the end of June through late July; however, the 1986 survey found no additional decline. The population structure was similar between the years, although the sex ratio changed

slightly. The overall trap success ratio in 1986 was similar to 1985, but was less than that of previous studies. No severely diseased turtles were found in 1986, although about 12 percent had mild symptoms and 17 percent showed evidence of recovery. Assessing the importance of the disease to the decline in the population is hampered by the activities of commercial collectors who are known to have removed turtles from Sipsey Fork in July 1985.

BOX SCORE OF LISTINGS/RECOVERY PLANS

Category	ENDANGERED			THREATENED			SPECIES* TOTAL	SPECIES HAVING PLANS
	U.S. Only	U.S. & Foreign	Foreign Only	U.S. Only	U.S. & Foreign	Foreign Only		
Mammals	25	20	242	5	0	22	314	23
Birds	61	16	141	3	2	0	223	55
Reptiles	8	6	60	9	4	13	100	21
Amphibians	5	0	8	3	0	0	16	6
Fishes	39	4	11	21	6	0	81	43
Snails	3	0	1	5	0	0	9	7
Clams	23	0	2	0	0	0	25	21
Crustaceans	4	0	0	1	0	0	5	1
Insects	8	0	0	5	0	0	13	12
Plants	106	6	1	24	3	2	142	54
TOTAL	282	52	466	76	15	37	928	243**

* Separate populations of a species, listed both as Endangered and Threatened, are tallied twice. Species which are thus accounted for are the gray wolf, bald eagle, American alligator, green sea turtle, Olive ridley sea turtle, leopard, and piping plover.

** More than one species may be covered by some plans, and a few species have more than one plan covering different parts of their ranges.

Number of Recovery Plans approved: 207

Number of species currently proposed for listing: 24 animals
35 plants

Number of Species with Critical Habitats determined: 96

Number of Cooperative Agreements signed with States: 47 fish & wildlife
26 plants

October 31, 1986

October—November 1986

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ENDANGERED SPECIES

Technical Bulletin

Department of Interior, U.S. Fish and Wildlife Service
Endangered Species Program, Washington, D.C. 20240

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ENDANGERED SPECIES

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NEWARK PUBLIC LIBRARY

A Bird and Three Plants Proposed for Listing

During November 1986, the following bird and plant taxa were proposed for addition to the U.S. List of Endangered and Threatened Wildlife and Plants:

Roseate Tern (*Sterna dougallii dougallii*)

A graceful, dove-sized coastal bird, the roseate tern is similar in appearance to several other species of terns occurring in the United States and elsewhere throughout the world. Terns nest on the ground, usually in dense colonies. Often, two or more species share the same nesting colonies. Although all tern species face the same kinds of problems, roseate terns in the U.S. and the Caribbean are particularly vulnerable because their nesting populations are small, localized, and subject to competition and predation from other animals. Accordingly, the FWS has proposed listing these roseate tern populations as Endangered and Threatened, respectively (F.R. 11/4/86).

Of the five subspecies of roseate terns recognized worldwide, only *S. d. dougallii* occurs in the Northern Hemisphere. It is comprised of three widely separated breeding populations in the northeastern coast of North America, certain islands in the Caribbean Sea, and the coast of northwestern Europe. Migrants from the northeastern U.S. winter primarily off the north coast of South America from Columbia to eastern Brazil. The wintering grounds of the Caribbean birds are still unknown, but may be in the same general areas.

Although the roseate tern's nesting range in northeastern North America is often given as extending from Nova Scotia to Virginia or North Carolina, it was only common in the central part of this range (Massachusetts to Long Island), and in recent years has all but disappeared from the periphery. In the Caribbean region, most roseate terns nest in Puerto Rico and the U.S. Virgin Islands, although significant numbers have been reported from the Bahama Islands, and some nest in the Dry Tortugas and the lower Florida Keys. Population trends for roseate terns in the Caribbean are not as clear as for the northeast, but they face similar threats.

Loss of nesting habitat has been a major factor in the species' decline in the north-

east, where almost all important colonies of roseate terns are on small coastal islands. Nesting habitat for the northeastern North America population has been greatly reduced by human development of such islands, particularly those with sandy beaches. In the Caribbean region, almost all recorded breeding sites have been on small islets that, although too small for development, are regularly visited by "eggers" who collect large numbers of tern eggs for human consumption.

Competition for the remaining breeding sites is another problem. In southern New England, many traditional sites were abandoned by the roseate tern in the 1940's and 1950's when herring (*Larus argentatus*) and great black-backed (*L. marinus*) gulls rapidly expanded their nesting ranges southward into that region. These large, aggressive gulls gradually took over the nesting grounds on most of the outer islands that were preferred by terns, forcing them into sites that often were closer to shore and therefore more accessible to other predators and human disturbance. The impact of gulls is illustrated by the fact that 60 percent of all

nesting roseate terns in the northeastern population, as well as large numbers of common terns, are supported on one Massachusetts island where a gull removal program was implemented.

The main reason why roseate terns breed most successfully on small islands is the lack of predatory mammals, including foxes, skunks, and rats. If such predators gain access, the terns soon abandon the site. (In the Caribbean, the mongoose also is a problem.) Predatory birds, particularly the great horned owl (*Bubo virginianus*) and the black-crowned night-heron (*Nycticorax nycticorax*), pose an even greater threat because they can fly over water to the islands. Although the adult terns are not highly vulnerable to most predators other than humans, the eggs and young are, and reproduction for an entire colony can be wiped out in a relatively short time.

Human predation on roseate terns nesting is of some importance in the Caribbean, where the collection of eggs is still a common, although illegal, practice. Another major cause of the roseate tern's decline may

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Terns are graceful, whitish seabirds with black caps and long, forked tails. The roseate tern (above) can be distinguished from other species in North America by its mostly black bill and a slight rosy tint on its breast during summer. In winter, the black cap is largely replaced with a white forehead. Both sexes look alike.

photo by J.J. Hatch,
courtesy of the Massachusetts Audubon Society



Regional News

Endangered Species Program regional staff members have reported the following activities for the month of November:

Region 1—The California Native Plant Society, in conjunction with several State

of California and Federal agencies (including the Bureau of Land Management, U.S. Forest Service, and Fish and Wildlife Service), conservation groups, and private corporations, sponsored a conference for the conservation and management of rare

and endangered plants on November 5-8, 1986. Over 800 people attended the 4-day conference held in Sacramento. The conference included papers and workshops on plant ecology and systematics, population dynamics, mitigation for project impacts, long-range planning, propagation and reintroduction techniques, preserve design, current conservation activities, rare plant survey techniques, habitat enhancement, legal mandates, education, and public involvement.

* * *

The Desert Fishes Council held its 18th annual symposium in St. George, Utah. The expanded agenda filled 3 days and included topics ranging from protection of small desert springs to preserving flows in the Colorado River. Special sessions included management of the Ash Meadows National Wildlife Refuge and the potential use of the Colorado squawfish (*Ptychocheilus lucius*) as a game species. More than 25 FWS people from three regions and the Washington Office attended.

* * *

Region 2—In late October, President Miguel de la Madrid of Mexico signed legislation that named and geographically defined 16 sea turtle nesting refuges along the coastal regions of the Republic of Mexico. Protected areas include nesting beaches on the Pacific coast for the Olive ridley (*Lepidochelys olivacea*) and leatherback (*Dermochelys coriacea*) sea turtles, and nesting beaches along the Atlantic Gulf coast for Kemp's ridley (*L. kempii*), hawksbill (*Eretmochelys imbricata*), and Atlantic green (*Chelonia mydas*) sea turtles. This commendable action by Mexico is the result of the efforts of many government employees and other Mexicans who continue to work to conserve their country's sea turtle resources. The Ministries of Fisheries, Urban Development and Ecology, and the Mexican Navy support this decree and are responsible for its implementation.

* * *

Region 2 has planned a joint plant recovery team meeting in Albuquerque for January 13-15, 1987. These annual plant recovery team meetings provide team members the opportunity to jointly discuss and advise the FWS on topics regarding Endangered and Threatened plants. This meeting will bring together the teams from Arizona, New Mexico, and Texas, along with other invited participants, for presentations and discussions on several topics of interest, including minimum viable populations, monitoring, and recovery actions by botanical gardens.

* * *

Leslie Canyon in southeastern Arizona may be acquired by the FWS in the near future.

(continued on page 3)

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U.S. Fish and Wildlife Service Regions

Region 1: California, Hawaii, Idaho, Nevada, Oregon, Washington, and Pacific Trust Territories. Region 2: Arizona, New Mexico, Oklahoma, and Texas. Region 3: Illinois, Indiana, Iowa, Michigan, Minnesota, Missouri, Ohio, and Wisconsin. Region 4: Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, South Carolina, Tennessee, Puerto Rico and the Virgin Islands. Region 5: Connecticut, Delaware, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, Vermont, Virginia and West Virginia. Region 6: Colorado, Kansas, Montana, Nebraska, North Dakota, South Dakota, Utah, and Wyoming. Region 7: Alaska. Region 8: Research and Development nationwide.

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Region 4, Richard B. Russell Federal Bldg., 75 Spring St., S.W. Atlanta, GA 30303 (404-331-3580); James W. Pulliam, Regional Director; John I. Christian, Assistant Regional Director; Marshall P. Jones, Endangered Species Specialist.

Region 5, One Gateway Center, Suite 700, Newton Corner, MA 02158 (617-965-5100); Howard Larson, Regional Director; Stephen W. Parry, Assistant Regional Director; Paul Nickerson, Endangered Species Specialist.

Region 6, P.O. Box 25486, Denver Federal Center, Denver, CO 80225 (303-236-7920); Galen Buterbaugh, Regional Director; John D. Green, Assistant Regional Director; Barry S. Mulder, Endangered Species Specialist.

Region 7, 1011 E. Tudor Rd., Anchorage, AK 99503 (907-786-3542); Robert E. Gilmore, Regional Director; Jon Nelson, Assistant Regional Director; Dennis Money, Endangered Species Specialist.

Region 8 (FWS Research and Development), Washington, D.C. 20240; Richard N. Smith, Regional Director; Endangered Species Staff; Clarence Johnson, fish and crustaceans (202-653-8772); Bettina Sparrowe, other animals and plants (202-653-8762).

Red Wolves Moved to North Carolina

In a step toward the reintroduction of the Endangered red wolf (*Canis rufus*) into the wild, four pairs were flown November 12 from captive propagation facilities to acclimation pens at Alligator River National Wildlife Refuge in North Carolina. These

wolves will be held at the release site for 6 months in an effort to acclimate them to their new environment. The FWS plans to release three of the pairs into the wild in April 1987, keeping the fourth pair in reserve as a back-up.

Release of the red wolves, as the first step in a planned establishment of an experimental population, was proposed by the FWS on July 24 (see story in BULLETIN Vol. XI No. 8-9) and approved November 19.



red wolf

photo by Steve Mastowski

Regional News

(continued from page 2)

future. Leslie Creek is one of the few remaining perennial streams in southern Arizona. The acquisition of the creek and its riparian vegetation community is identified in two recovery plans as a key step in the recovery of four listed Yaqui River fishes. Leslie Creek is one of only three areas in the United States where the Yaqui fishes can be recovered. Species that would be protected within this future refuge include the Yaqui chub (*Gila purpurea*), Yaqui catfish (*Ictalurus pricei*), beautiful shiner (*Notropis formosus*), and Sonoran topminnow (*Poeciliopsis occidentalis sonorensis*).

The current owner of Leslie Creek has offered to sell the 1,200-acre parcel of his ranch to The Nature Conservancy (TNC). Once purchased by TNC, the area would be sold to the FWS and managed as a satellite of the San Bernardino National Wildlife Refuge, where recovery actions for the Yaqui fishes are already under way.

• • •

Twenty of the 21 fledging-age whooping crane (*Grus americana*) chicks seen in Canada in August had arrived at Aransas National Wildlife Refuge in Texas by November 20. The parents of the twenty-first chick arrived without their chick, and it is presumed dead. Late November aerial surveys at Aransas were not completed

because of aircraft problems. With the excellent survival of the chicks that migrated to Aransas, this population could reach to 110 birds this winter.

The season's final significant flight of cranes into the middle Rio Grande Valley of New Mexico occurred on November 23 in association with a cold front. Five whooping cranes and an estimated 4,500 sandhill cranes (*Grus canadensis*) arrived from Colorado on that date. The Rocky Mountain whooping crane population is expected to be 25-27 birds.

• • •

Region 4—The Florida panther (*Felis concolor coryi*) captive breeding program

(continued on page 7)

Proposed Listings

(continued from page 1)

be the killing of wintering terns along the northeastern coast of South America for human consumption.

Because the roseate tern is thought to be in danger of extirpation from northeastern North America, the FWS proposed listing the birds in that region as Endangered. In the Caribbean, where the roseate tern's status is considered serious but not as critical, the FWS proposed to list it as Threatened. Comments on the listing proposals should be sent to the Regional Director, Region 5 (address on page 2 of the BULLETIN), by January 5, 1987.

Miami Palmetto (*Sabal miamiensis*)

With fewer than 11 individuals known to survive in the wild, the Miami palmetto may be the rarest plant species in Florida. In the early twentieth century, this member of the palm family (Arecaceae) was collected in the pinelands of the south Florida limestone ridge from Fort Lauderdale (Broward County) south to Miami and west to Kendall. Since that time, extensive conversion of pinelands to residential and commercial uses has reduced the range of the Miami palmetto to two sites, both in Dade County. At one site, along a fence at the edge of a construction project, three plants remain as part of what once had been a sizeable population, and even these survivors are expected to be removed soon. The only other Miami palmetto site is within a county park, where there are six to eight plants.

Fairchild Tropical Garden, a major botanical garden in Miami, is working to propagate the species from seed, and it will work with the FWS to implement reintroduction efforts. In the meantime, however, because the status of the Miami palmetto in the wild is extremely precarious, the FWS has proposed to list it as Endangered (F.R. 11/4/86).

Comments on the listing proposal are welcome, and should be sent to the Field Supervisor, Endangered Species Field Station, U.S. Fish and Wildlife Service, 2747 Art Museum Drive, Jacksonville, Florida 32207, by January 5, 1987.

Florida Bonamia (*Bonamia grandiflora*)

This perennial vine in the morning glory family (Convolvulaceae) is restricted to south-central Florida in sand pine "scrub" habitat consisting of evergreen oak scrub (*Quercus* spp.) and sand pine (*Pinus clausa*) with sandy openings between the trees and shrubs. The sunny, bare patches needed by the bonamia are created by infrequent, severe fires or by mechanical disturbance. Fire suppression, which allows



photo by Roger Sanders

Sabal miamiensis (in foreground) is a large-fruited dwarf palmetto with no above-ground stem. Each plant has three to six fan-shaped, yellow-green leaves.

vegetational succession in the openings, is one threat to the bonamia. An even greater danger is the widespread conversion of native scrub habitat to citrus groves and urban development.

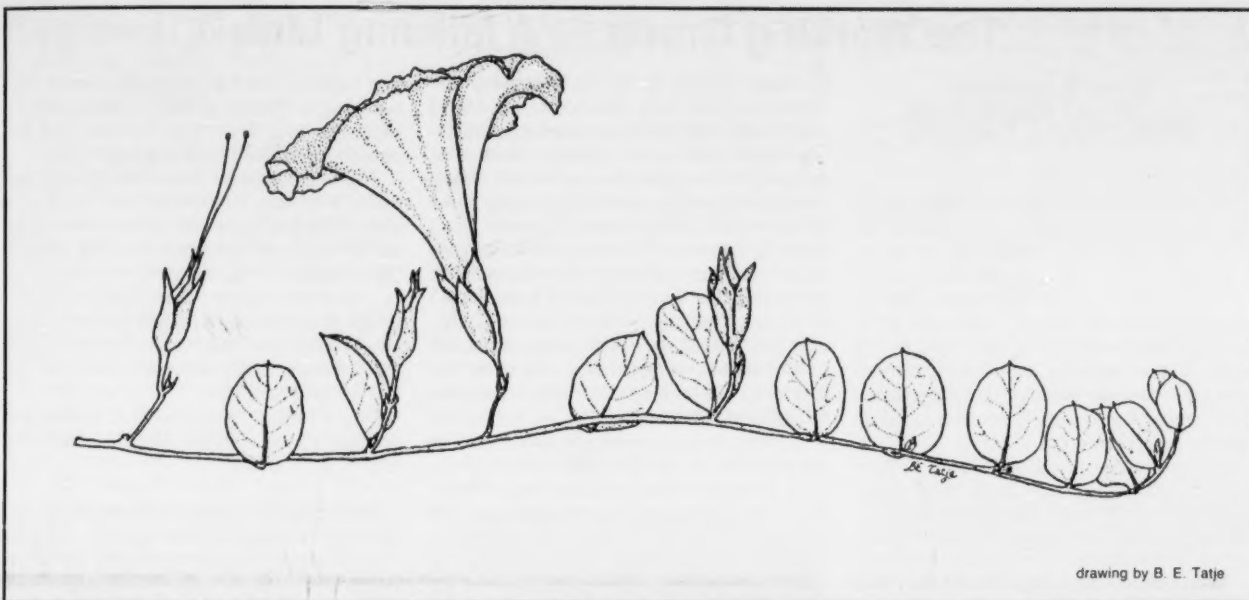
The Florida bonamia is extirpated from Sarasota, Manatee, Osceola, Volusia, and Lake Counties, and is reduced in the remainder of its range. It still survives in Ocala National Forest (Marion County) and at 18 sites to the south: one in Hardee County; 2 in Highlands County; 5 in Orange County; and 10 in Polk County. However, the factors that led to the species' decline continue, prompting the FWS to propose listing the plant as Threatened (F.R. 11/4/86).

The scrub vegetation occupying the central Florida sand ridge is extremely unique and contains numerous endemic species. In

response to the continuing modification and loss of this habitat, the FWS has in recent years listed or proposed listing 13 other plants and 4 animals, all of them endemic to sand pine scrub.

B. grandiflora does not occur within the densely wooded sections of Ocala National Forest, but along the forest edges, road rights-of-way, and fire lanes. The U.S. Forest Service's current management and its new Land and Resource Management Plan appear to be beneficial to the species. One other bonamia site, which is found within The Nature Conservancy's Tiger Creek preserve in Polk County, is protected, although land acquisition has not yet been completed. Because *B. grandiflora* already is listed under Florida law as endangered, the

(continued on page 5)



***Bonamia grandiflora* is a vine with sturdy prostrate stems approximately 3 feet (one meter) in length and small leathery leaves. Its funnel-shaped flowers are a pale but vivid blue with a paler center, similar to the cultivated "Heavenly Blue" morning glory.**

State regulates taking, transport, and sale of the plant, but habitat conservation is not ensured. Listing it under the Federal Endangered Species Act will augment and reinforce existing protective measures.

Comments on the listing proposal are welcome, and should be sent to the Jacksonville Office by January 5, 1987.

Bradshaw's Lomatium (*Lomatium bradshawii*)

The Bradshaw's lomatium, a small, herbaceous perennial plant in the parsley family (Apiaceae), is endemic to the lowland prairie community of the Willamette River Valley in Oregon. Once distributed throughout the valley and apparently abundant, this species now is composed of only eight or nine remnant populations where prairie habitat has so far escaped conversion to agriculture and other uses. These populations range in size from several thousand plants to only a few individuals, and their potential for long-term survival also varies. *L. bradshawii* has been proposed for listing as Endangered (F.R. 11/21/86).

Although the loss of native prairie habitat to agricultural uses has been the most significant factor in the species' decline, expanding residential and industrial development threatens much of the remaining habitat. For example, over 90 percent of the plants now are concentrated in a population near Willow Creek, at the city limits of Eugene, on privately owned land that has been under consideration in the past for residential development. The site, however, is currently under lease to The Nature Conservancy, and the local community is negotiating in an attempt to preserve the land. The Willamette daisy (*Erigeron de-*

cumbens var. *decumbens*), a Category 2 candidate for a future listing proposal, also occurs at the site.

Another threat to the Bradshaw's lomatium is fire suppression, which allows the encroachment of competing woody plants. One small population located on the William L. Finley National Wildlife Refuge (NWR) probably has benefited from the use of controlled burning as a habitat management practice. Future refuge management will include provisions to improve the status of this population.

In addition to the *L. bradshawii* site on Finley NWR, there are two other populations on federally managed public lands. One of the largest remaining populations is on lands managed by the U.S. Army Corps of Engineers located adjacent to the Fern Ridge Reservoir. There is also a remnant population on land administered by the Bureau of Land Management (BLM) near the Long Tom River; half of that population was destroyed when adjacent private lands were plowed. If the listing proposal becomes final, these Federal agencies will be required to ensure that their activities are compatible with conservation of *L. bradshawii* habitat.

Comments on the listing proposal should be sent to the Regional Director, Region 1, by January 20, 1987.

* * *

Available Conservation Measures

Among the conservation benefits provided by a listing as Threatened or Endangered under the Endangered Species Act are: protection from adverse effects of Federal activities; prohibitions against certain practices; the requirement for the FWS

to develop and implement recovery plans; the possibility of Federal aid to State conservation departments that have signed Endangered Species Cooperative Agreements with the FWS; and the authorization to seek land purchases or exchanges for important habitat. Listing also lends greater recognition to a species' precarious status, which encourages further conservation efforts by State and local agencies, various organizations, and individuals.

Section 7 of the Act directs Federal agencies to use their authorities to further the purposes of the Act by carrying out conservation programs for listed species. It also requires these agencies to ensure that any actions they authorize, fund, or carry out are not likely to jeopardize the survival of a listed species or adversely modify its designated Critical Habitat. If any agency finds that one of its activities may affect a listed species, it is required to consult with the FWS on ways to avoid jeopardy or adverse modification. For species that are *proposed* for listing and for which jeopardy or adverse modification is found, Federal agencies are required to "confer" with the FWS, although the results of such a conference are non-binding. Potential conflicts almost always are avoided by planning early and using the Section 7 process.

Further protection is authorized by Section 9 of the Act, which makes it illegal to take, possess, transport, or engage in interstate or international trafficking in listed animals, except by permit for certain conservation purposes. For listed plants, the rule is different; the trafficking restrictions apply, but collecting of listed plants is prohibited without a permit only on lands under Federal jurisdiction. Some States, however, have their own laws protecting listed plants and animals that may be more restrictive.

The Working Group — A Missing Link

Robert M. Hazelwood
U.S. Fish and Wildlife Service
Helena, Montana, Field Office

For many Endangered and Threatened species, recovery teams have played an important role in the preparation of recovery plans and in other important facets of recovery. However, throughout the nation, other species-oriented groups are influencing and coordinating management of specific species on a daily basis. Recent efforts have shown that such working groups can be a very effective force in wildlife management.

In the western United States, inter-agency working groups have been quite successful with two Endangered species, the bald eagle and peregrine falcon. These interagency working groups are made up of professional biologists from State and Federal agencies, along with public and private organizations, that are involved in management and protection of listed species and their habitat. The basic purpose

of these working groups is to assist in implementing recovery plan objectives and to coordinate management, research, and information exchange in their respective geographical areas. Two of the four designated bald eagle working groups have completed management plans for their specific areas. It should be noted that these management plans are not intended to replace the Pacific States Bald Eagle Recovery Plan, but to serve as an *extension* of the recovery plan, stepping down and localizing management recommendations that are only summarized in national or regional recovery plans.

Working groups generally meet formally twice a year. In addition, individuals on local subcommittees assume major workload assignments to be carried out throughout the year. The data collection and dissemination by these groups are useful for tracking recovery efforts and implementing recovery tasks. Recently the Montana and Greater Yellowstone Ecosystem Bald Eagle Working Groups combined efforts to synthesize management

and recovery of the peregrine falcon and bald eagle. Efforts of this tri-State (Idaho, Montana, and Wyoming) cooperative approach have been encouraging.

The trial period for the working group approach is now over, and the verdict is clear. These groups can serve as an intrinsic link between recovery planning and implementation. They also offer an easy way to enhance coordination and avoid duplication of effort among all involved agencies. Ultimately, this means there can be more effective and efficient use of the limited funding available.

Copies of the management plans discussed above can be obtained from the following locations:

Bald Eagle Management Plan for the Greater Yellowstone Ecosystem, Special Publications, Wyoming Game and Fish Department, Cheyenne, Wyoming 82002 (price - \$10.00 per copy); *Montana Bald Eagle Management Plan*, Bureau of Land Management, Montana State Office, P.O. Box 36800, Billings, Montana 59107.

Vandalism of Small Whorled Pogonia

Thomas J. Rawinski
The Nature Conservancy
Boston, Massachusetts

The small whorled pogonia (*Isotria medeoloides*) is a terrestrial orchid that was listed by the Fish and Wildlife Service in the September 10, 1982, *Federal Register* as an Endangered Species. In New Hampshire, where most *Isotria* sites are monitored annually, a population in Milton consisting of approximately eight stems was found on June 24, 1986, to have been vandalized. Instead of finding the plants, Nature Conservancy ecologist Tom Rawinski and Cornell University botanists Dr. Philip Dixon and Dr. Robert Cook found 7 recently dug holes measuring roughly 2 inches wide by 3 inches deep. All of the pogonias had been removed from the population, which had occupied an area of 20 by 50 yards and had been monitored annually since 1980.

Though the location of this population has been kept confidential by staff of the New Hampshire Natural Heritage Inventory, the station could have been found by the perpetrator(s) using location data obtained from an older herbarium specimen. This incident serves to demonstrate the vulnerability of *Isotria medeoloides*. With rigorous monitoring and educational campaigns, it is hoped that such deliberately destructive activities can be prevented in the future.

Because of their intimate association with certain soil fungi, it generally is very difficult to successfully transplant terrestrial orchids.



drawing by Susan Edwards,
courtesy of the Natural Resources
Defense Council

Isotria medeoloides (small whorled pogonia)

Regional News

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is progressing as planned. The male panther that was injured by an automobile in south Florida in November 1984 has been transferred to the captive breeding facility located north of Jacksonville. The panther appears to have adapted well to his new environment.

The next phase of the project is to determine if the male is capable of breeding. To test this, two female cougars of non-listed western subspecies were captured and transported to the breeding site. The females were placed in their respective pens, located on each side of the male's pen. After a period of adjustment, the females began to move around their pens, but little interest was shown by either sex. Recently, however, one of the females cycled, and the male began to show a great deal of interest. Both the female and male walked together up and down the enclosure, separated by the fence. As of December 1, the cats had not been placed together, but a breeding attempt is planned for when the female cycles again.

The scrub lizard (*Sceloporus woodi*) is endemic to Florida, where it occurs in scrub habitats along the central ridge of the State, as well as along the Atlantic coast and in a small area on the southwestern gulf coast. A status survey for this species, which is a Category-2 candidate for Federal listing, is being carried out by the Florida Cooperative Fish and Wildlife Research Unit. An interim report indicates that the scrub lizard may be extirpated along the Gulf Coast. Several known sites along the Atlantic coast have been eliminated, but over 30 new sites were discovered. Unfortunately, many of these sites are subject to future development. The status of the species in the central and largest part of its range will be addressed in the final report. The scrub lizard is threatened by the conversion of scrub veg-

etation for agricultural, residential, and commercial purposes.

North Key Largo, Florida, is one of three remaining nesting areas for the Endangered American crocodile (*Crocodylus acutus*). A nest survey and monitoring program was initiated on Key Largo in 1978. Nest numbers have fluctuated between three and five nests annually; this year, six nests were discovered. A crocodile nest usually holds about 30 eggs. However, of the estimated 180-200 eggs laid this season, only 90 to 100 eggs hatched. Three nests failed completely. Biologists attribute this year's low hatching rate to the dry winter and summer weather.

A Gopher Tortoise Relocation Symposium is scheduled for June 27, 1987, in Hume Auditorium at the University of Florida at Gainesville. The symposium, sponsored by the Florida Game and Fresh Water Fish Commission, the Gopher Tortoise Council, and the Florida State Museum, will evaluate the effectiveness of gopher tortoise (*Gopherus polyphemus*) relocation as a management technique or as a mitigative measure in instances of conflicting land use objectives. Those interested in attending and/or submitting a paper or note should contact: Don A. Wood, Division of Wildlife, Florida Game and Fresh Water Fish Commission, 620 South Meridian, Tallahassee, Florida 32301.

Region 5—Status survey work on 33 plants contracted to The Nature Conservancy in 1985 has been completed. Thirteen of the 33 species surveyed are being considered by the regional staff for possible Endangered Species Act listing proposals.

Members of the Atlantic Coast Piping Plover Recovery Team and representatives from private conservation groups,

State fish and wildlife agencies, the Canadian Wildlife Service, and independent researchers met in Newton Corner, Massachusetts on November 18 and 19 to discuss the preliminary draft recovery plan. The plan will be revised based on comments received, and the review draft will be circulated in January 1987 for formal comment.

Draft revisions to the *Chesapeake Bay Bald Eagle Recovery Plan* and *Eastern Peregrine Falcon Recovery Plan* have been made. The draft plans will be submitted to Washington for review in the near future.

Region 6—A record number of whooping crane sightings (Wood Buffalo National Park-Aransas National Wildlife Refuge flock) were reported to the FWS Migration Monitoring Center at the Grand Island Field Office Complex in Nebraska during the 1986 fall migration. A total of 31 confirmed sightings of one or more birds were reported. One of those was on the Platte River Critical Habitat area, where three whoopers were seen. The sightings were distributed as follows: North Dakota—2, South Dakota—4, Nebraska—4, Kansas—12, and Oklahoma—9. Observations of 18 different color-banded birds were reported.

The peak of the migration occurred during the first week in November, about one week later than normal. The late migration was probably due to very mild weather during October. The most popular area during migration was the Cheyenne Bottoms State Wildlife area in central Kansas, where 26 whoopers stopped November 3-8.

Region 7—An American peregrine falcon (*Falco peregrinus anatum*), banded as a nestling near Aniak, Alaska, this past July was killed November 18 in a collision

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whooping cranes

photo by Luther C. Goldman

Regional News

(continued from page 7)

with a commercial airliner at San Jose, California. This is the forty-ninth band return since systematic banding of Alaska's peregrines began in 1979. Returns from such diverse locations as Washington, North Carolina, Texas, El Salvador, Ecuador, Brazil, and Argentina provide information on peregrine migration routes and wintering areas.

• • •

A number of new zoos joined the list of Aleutian Canada goose (*Branta canadensis leucopareia*) cooperators last year. A total of 17 facilities in the United States and Canada now have Aleutian geese for breeding and display purposes. The Tama and Yagiyama Zoos in Japan also have Aleutian geese, and successfully raised young in 1985 and 1986. A small number of geese were released in Japan near Lake Izunuma in hope that they would join a wild flock of white-fronts and reestablish a migratory tradition. The Japanese plan to release five more young birds this fall. In total (U.S., Japan, and Canada), 16 goslings were raised in captivity in 1986 and the captive flock now numbers 118 birds.

• • •

Endangered Wildflower Calendar

The 1987 *Endangered Wildflower Calendar* is now available from the American Horticultural Society (AHS). This 8½-by 23-inch wall calendar features full-color photographs of 16 rare American

wildflowers, individual summaries on their status, and general information on endangered plants. Proceeds from the calendar sales enable the AHS to award up to \$250 to non-profit organizations whose members or supporters provide information on the rediscovery of plants generally thought to be extinct. To order, send \$6.95 per calendar (\$6.25 for AHS members) to Jeanne Eggeman, AHS, P.O. Box 0105, Mount Vernon, Virginia 22121.

For orders of 3 or more calendars, send \$6.45 for each (\$5.75 for AHS members). These prices include postage and handling, but Virginia residents should add 4 percent sales tax.

For the AHS list of plants that are considered extinct, send a self-addressed business-sized envelope and \$1.00 for postage and handling to the Wildflower Rediscovery Project at the same address.

BOX SCORE OF LISTINGS/RECOVERY PLANS

Category	ENDANGERED			THREATENED			SPECIES* TOTAL	SPECIES HAVING PLANS
	U.S. Only	U.S. & Foreign	Foreign Only	U.S. Only	U.S. & Foreign	Foreign Only		
Mammals	25	20	242	5	0	22	314	23
Birds	61	16	141	3	2	0	223	55
Reptiles	8	6	60	9	4	13	100	21
Amphibians	5	0	8	3	0	0	16	6
Fishes	39	4	11	21	6	0	81	43
Snails	3	0	1	5	0	0	9	7
Clams	23	0	2	0	0	0	25	21
Crustaceans	4	0	0	1	0	0	5	1
Insects	8	0	0	5	0	0	13	12
Plants	106	6	1	24	3	2	142	54
TOTAL	282	52	466	76	15	37	928	243**

* Separate populations of a species, listed both as Endangered and Threatened, are tallied twice. Species which are thus accounted for are the gray wolf, bald eagle, American alligator, green sea turtle, Olive ridley sea turtle, leopard, and piping plover.

** More than one species may be covered by some plans, and a few species have more than one plan covering different parts of their ranges.

Number of Recovery Plans approved: 207

Number of species currently proposed for listing: 25 animals
38 plants

Number of Species with Critical Habitats determined: 96

Number of Cooperative Agreements signed with States: 47 fish & wildlife
26 plants

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ENDANGERED SPECIES

Technical Bulletin

Department of Interior U.S. Fish and Wildlife Service
Endangered Species Program, Washington, D.C. 20240

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